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STAFF TECHNICAL MEMORANDUM

REGIONAL INCOME INEQUALITY AND STATE DEVELOPMENT IN PENNSYLVANIA

BY

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COMMONWEALTH OF PENNSYLVANIA
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I. Introduction

Governments at the Federal and State levels in the United States are concerned with problems of regional inequality. In Pennsylvania the State Government has formulated many regional development programs in cooperation with that of the Federal Government in stimulating the economy of stagnant regions. The efforts made by the state and federal governments as a whole aim to diminish or eliminate the relative or absolute disparity between the lagging and advanced regions, by achieving rates of growth which are above the average in lagging regions.

In the last twenty years, a number of regional economists have attempted to incorporate regional inequality and regional development policy into a general theory of economic growth. Most regional analyses have proceeded from the empirical finding that regional inequality tends to go through a process of increasing and then decreasing significancy.* Williamson described this trend of regional development as an inverted "U" pattern.

In 1957 Gunnar Myrdal wrote a study about the consequences of movements in relation to his theories of "backwash" and "spread" effects. ** Backwash

*Williamson, J. G., Regional Inequality and the Process of National Development: A Description of the Patterns, Economic Development and Cultural Change, Vol. 8, No. 4, July 1965, pp. 3-84. Hanna, F. R., State Income Differentials, 1919-1954, Durham: Duke University Press, 1959. Eastermin, R. A., Interregional Differences in Per Capita Income, Population and Total Income, 1840-1950, Trends in the American Economy in the Nineteenth Century, Princeton: Princeton University Press, 1960, pp. 73-140. Lasuen, J.R., Regional Income Inequalities and the Problems of Growth in Span, Papers of REgional Science Association, Vol. 8, 1962, p.p. 169-188. Baer, W., Regional Inequality and Economic Growth in Brazil, Economic Development and Cultural Change, Vol. XII, No. 3, April 1964, p.p. 268-285. Ou, F. L., Regional Inequality and National Development in China, Unpublished paper, 1974 . Reiner,T. A., Welfare Differences within A Nation, PRSA, Vol. 22, 1974,pp. 65-82. Parr, J. B., Welfare Differences within A Nation: A Comment, PRSA, Vol. 22, 1974, pp. 83-91.

** Myrdal, G., Economic Theory and Under-Developed Regions, London: Gerald Dudeworth & Co. Lt., 1957, pp. 27-33.

effects are those mainly developed by labor migration, capital flow and market forces. Backwash effects stimulate the geographic concentration or specialization of economic activity and increase the trend toward regional inequalities. Spread effects are those effects developed by technology flow, infrastructural setting, the communication system, and transport facilities. Spread effects result in a greater dispersion of economic activity and tend to reduce regional inequalities. In Chart 1 lists are such "backwash" and "spread" effects.

Generally, the first stage of interregional development tends to favor one special region which abosorbs labor and capital from a country's other regions. This first stage of interregional development is influenced by these backwash effects. After better infrastructure in the under-developed regions evolves, transport and communication networks between the developed and the under-developed regions become more effective. Market forces from the developed region increase, and the under-developed regions develop potential to attract their own labor and capital. Late in the first stage of development the spread effects begin to be observed.

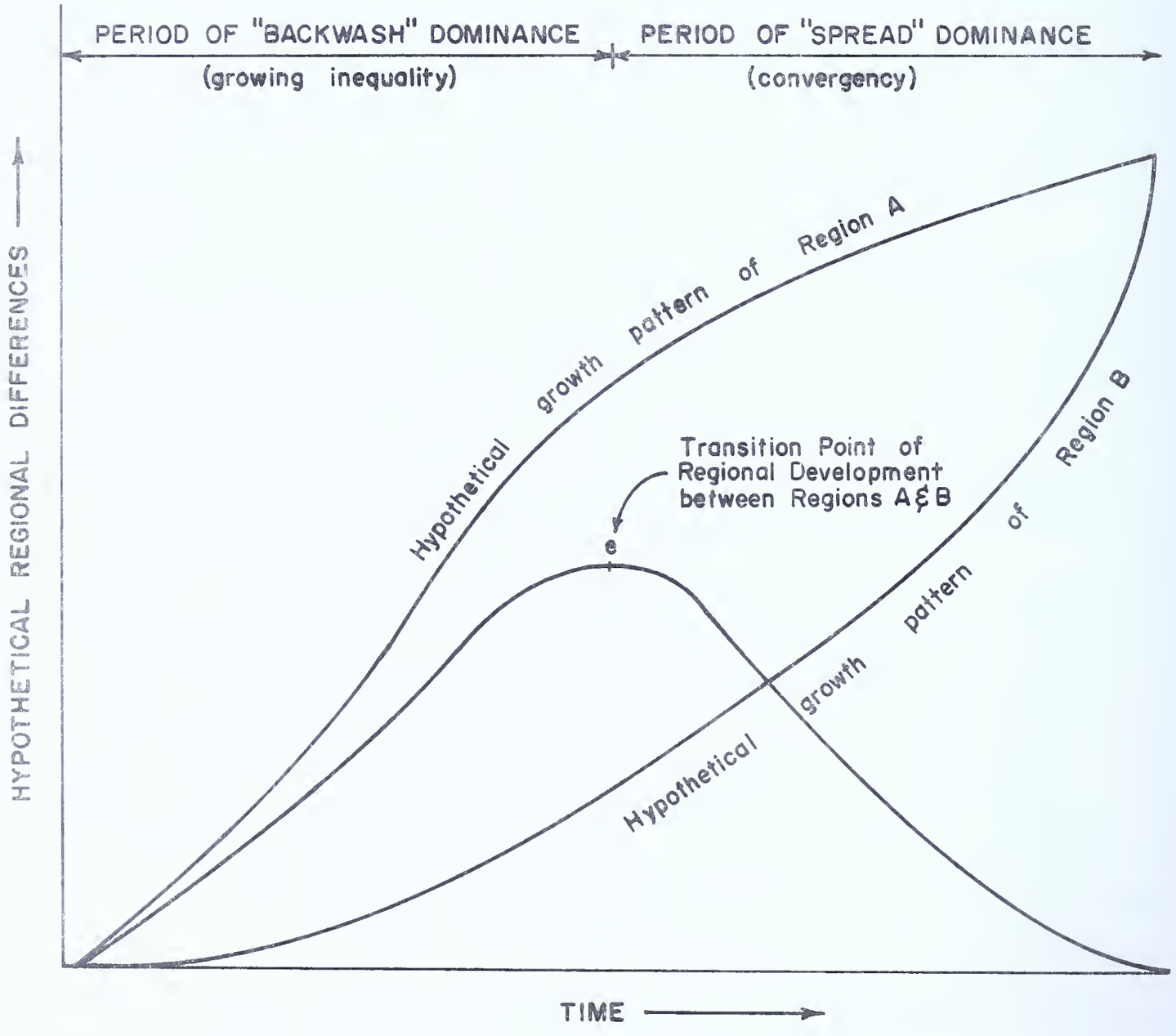
In the second stage of development the spread effects are predominant. At the moment when the backwash effects equal the spread effects the interregional difference reaches its peak; that is, at this point the interregional differences are maximized. This state of balance between opposing forces is called the transition point of interregional development. From Figure 1 it can be seen that at the transition point e the growth rates of both regions A and B are equal. After point e region B grows faster than region A. This trend tends to diminish the difference between the two regions.

Chart 1 Factors in Growing and Reducing Regional Inequality

Backwash (growing inequality)	Spread (reducing inequality)
Selective migration	Less selective migration
Capital migration	Contrary capital movement
Public policy to enhance national economic growth	Compensatory public policy
Lack of interregional linkages	Forging of linkages
Strong differentiation in,e.g., infrastructure (scale economies)	Homogenization of nation as to public capital in place
Differential labor force dependency ratio	More homogeneous population structure

Source: Reiner, op. cit., p.p. 70.

FIGURE 1: SIMULATION OF REGIONAL DIFFERENCES



The normal distribution curve shown in Figure 1 expresses this diminishing difference. This curve has the Williamson's inverted "U" property. Up to now no formulation can be applied to describe this curve precisely because the shape of this curve will vary with diverse development policies. Most likely it seems that various regional balanced growth policies would lead the interregional difference pattern to be a Gamma distribution rather than a normal distribution. In most countries the backwash effects acting to increase regional disparity has been processed for a long time. Today, with the careful planning it is possible for governments to rapidly reduce backwash effects and increase spread effects in a short period.

For measuring the regional inequality it is important to select a variable with an attribute attached to a population in terms of its location. The selected variable should be an indicator of objective and its level represents attainment of the goal. The most important is that the selected variable should be a valid indix of performance of the socio-economic system. Since personal income is a spatially defined variable, which meets the above requirements, and a valid measure of development, this study uses personal income as quantifier of regional inequality. The main purpose of this study is to investigate the trend of interregional income inequality in Pennsylvania and to determine the impact of various factors associated with income distribution.

The measure of regional development to be used will be personal income per capita in labor market areas with maximum regional homogenity in term of economic structure. These regional per capita income estimates are in current dollars (Table 1). Nowhere in this study has an attempt been made to reduce them to constant dollars. Rather, regional data will often be expressed in relatives of the state average. These relatives are identical with those that could be computed from constant dollar figures obtained by

Table 1. Per Capita Personal Income, for Labor Market Areas in Pennsylvania, Selected Years From 1929 to 1971

	1929	1940	1950	1959	1962	1965	1966	1967	1968	1969	1970	1971
1. Erie*	$749	$663	$1,645	$2,030	$2,269	$2,736	$2,903	$3,020	$3,146	$3,387	$3,700	$3,94
2. Meadville	614	558	1,257	1,868	1,958	2,342	2,639	2,843	2,947	3,175	3,402	3,55
3. Oil City-Franklin	798	520	1,301	1,769	1,859	2,234	2,362	2,571	2,794	3,044	3,449	3,61
4. Warren	648	506	1,314	1,872	2,091	2,552	2,779	3,056	3,285	3,547	3,828	3,94
5. Sharon-Farrell	652	580	1,646	2,306	2,398	2,833	3,062	3,233	3,386	3,590	3,766	3,94
6. New Castle	631	523	1,558	2,018	2,261	2,620	2,825	3,030	3,105	3,432	3,580	3,80
7. Clarion	391	352	1,023	1,614	1,771	1,924	2,106	2,318	2,624	2,911	3,192	3,43
8. Butler	462	481	1,284	1,989	2.136	2,627	2,765	2,989	2,986	3,238	3,469	3,62
9. Kittanning-Ford City	798	520	1,301	1,605	1,846	2,111	2,498	2,593	2,684	2,889	3,039	3,21
10. Indiana	457	420	1,211	1,637	1,673	1,884	2,036	2,284	2,325	2,627	2,946	3,09
11. Pittsburgh*	883	732	1,665	2,383	2,505	2,929	3,120	3,313	3,555	3,808	4,065	4,29
12. Waynesburg	463	421	1,202	1,528	1,486	1,839	2,016	2,191	2,294	2,572	2,950	2,92
13. Uniontown-Connellsville	385	345	1,092	1,524	1,646	1,905	2,024	2,220	2,329	2,579	2,855	3,05
14. Johnstown*	566	511	1,177	1,566	1,711	2,064	2,205	2,315	2,490	2,725	2,998	3,15
15. Altoona*	625	565	1,295	1,821	1,922	2,264	2,360	2,533	2,783	3,076	3,332	3,50
16. Bedford	293	282	802	1,394	1,408	1,664	1,807	2,103	2,443	2,751	2,962	3,12
17. Huntingdon	488	375	1,130	1,385	1,538	1,922	2,116	2,388	2,527	2,701	2,872	3,06
18. Punxsutawney	402	401	1,175	1,623	1,803	1,976	2,139	2,294	2,558	2,804	3,108	3,32
19. Clearfield-Du Bois	433	413	1,121	1,541	1,600	1,973	2,129	2,417	2,560	2,759	3,047	3,25
20. St. Marys	536	518	1,523	1,983	2,190	2,434	2,771	3,017	3,163	3,334	3,534	3,68
21. Emporium	831	1,155	2,640	2,862	2,177	2,866	3,211	3,899	3,713	4,152	4,183	4,14
22. Bradford	860	609	1,488	1,886	2,332	2,664	2,994	3,348	3,201	3,521	3,675	3,81
23. Coudersport	378	323	923	1,339	1,656	1,958	2,141	2,380	2,568	2,831	3,098	3,03
24. Wellsboro	407	390	1,145	1,661	1,755	1,865	2,070	2,269	2,421	2,618	2,847	2,93
25. Sayre-Athens-Towanda	521	438	1,163	1,657	1,723	2,011	2,226	2,620	2,726	3,976	3,198	3,25

Table 1 (continued)

	1929	1940	1950	1959	1962	1965	1966	1967	1968	1969	1970	1971
26. Dushore-Laporte	416	319	1,041	1,415	1,465	1,729	1,881	2,141	2,508	2,707	2,850	2,919
27. Tunkhannock	402	354	915	1,436	1,544	1,710	1,874	2,368	3,248	3,554	3,602	3,688
28. Susquehanna*	537	449	1,080	1,587	1,746	2,066	2,282	2,509	2,738	2,939	3,116	3,154
29. Bellefonte-State College	423	392	1,195	1,515	1,739	1,883	2,088	2,334	2,622	2,828	3,016	3,190
30. Lock Haven-Renovo	506	472	1,296	1,799	1,812	2,201	2,490	2,710	2,784	3,124	3,146	3,332
31. Williamsport*	659	547	1,452	1,969	2,101	2,432	2,694	2,966	3,138	3,348	3,588	3,733
32. Lewistown	504	447	1,250	1,721	1,871	2,285	2,475	2,772	2,977	3,214	3,424	3,664
33. Sunbury-Shamokin	514	395	1,210	1,633	1,784	2,107	2,295	2,563	2,788	3,088	3,371	3,508
34. Berwick-Bloomsburg	445	418	1,205	1,756	1,991	1,989	2,230	2,460	2,828	3,108	3,308	3,401
35. Pottsville	422	341	1,118	1,668	1,805	2,219	2,358	2,580	2,845	3,153	3,429	3,651
36. Northeast Pennsylvania*	633	474	1,248	1,764	1,922	2,202	2,363	2,605	2,836	3,088	3,331	3,559
37. Honesdale-Matamoras	452	345	1,005	1,561	1,608	1,786	1,958	2,319	2,657	2,937	3,227	3,083
38. Chambersburg-Waynesboro	502	468	1,366	1,824	2,044	2,452	2,723	3,013	3,085	3,368	3,551	3,675
39. Harrisburg	768	694	1,594	2,225	2,356	2,643	2,771	3,031	3,269	4,625	3,930	4,212
40. Lebanon	538	512	1,453	2,154	2,220	2,524	2,709	2,903	3,243	3,576	3,835	3,902
41. York*	623	543	1,559	2,074	2,208	2,561	2,728	2,973	3,242	3,587	3,921	4,009
42. Lancaster*	664	581	1,600	2,179	2,385	2,792	2,973	3,090	3,265	3,583	3,848	3,983
43. Reading*	772	649	1,615	2,210	2,360	2,873	3,025	3,250	3,512	3,821	4,065	4,285
44. Allentown-Bethlehem-Easton	782	677	1,670	2,125	2,407	3,002	3,055	3,167	3,433	3,745	4,033	4,218
45. Philadelphia*	961	799	1,729	2,536	2,738	3,122	3,373	3,615	3,888	4,201	4,447	4,692
Pennsylvania	767	641	1,543	2,265	2,371	2,749	2,982	3,173	3,402	3,688	3,942	4,147

Source: U. S. Department of Commerce, Regional Economics Systems, Office of Business Economics.

applying a uniform price deflator to each of the labor markets. The order of the labor market areas in the general tables in this study follows the classification of the U. S. Bureau of the Census (Figure 2). It is recognized that regional price level differentials may affect the regonal income inequality, e.g., the cost of living is usually lower in the rural agricultural regions. However, since Pennsylvania is a highly developed state the divergence between regional price levels is likely to be reduced to a low level. This study therefore assumes that regional cost of living indices will not be accounted for in the computation since it has no significant effect upon estimates of regional inequality. * It should be noticed that this study also will not account for nonmarket sources of well-beings, such as the value of self-grown crops on subsistence farms, and for access to goods and services not exchanged on the market, such as schools, health facilities and cultural establishments. One should also bear in mind that the term "region" mentioned in this report refers to labor market area and has no association with "uniform region" as defined by the Commonwealth of Pennsylvania.

As shown in Table 2 the period 1929-1973 has been dominated by increasing per capita personal income in Pennsylvania. Decreases have been recorded in only eight of forty-four year-to-year changes and four of these decreases occurred during the Great Depression, 1929-1933. Since then single year-to-year decreases have occurred only between 1937-1938, 1948-1949, 1953-1954 and 1957-1958. In general, the larger year-to-year changes occurred during the Great Depression, World War II and the Korean Conflict.

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* In an earlier study of regional income inequality in Finland the regional cost of living indices were applied but produced little effect upon estimates of regional inequality. See Williamson, op. cit., p. 10.

Figure 2 Labor Market Areas, Pennsylvania, 1970
(as defined by the U.S. Bureau of the Census)

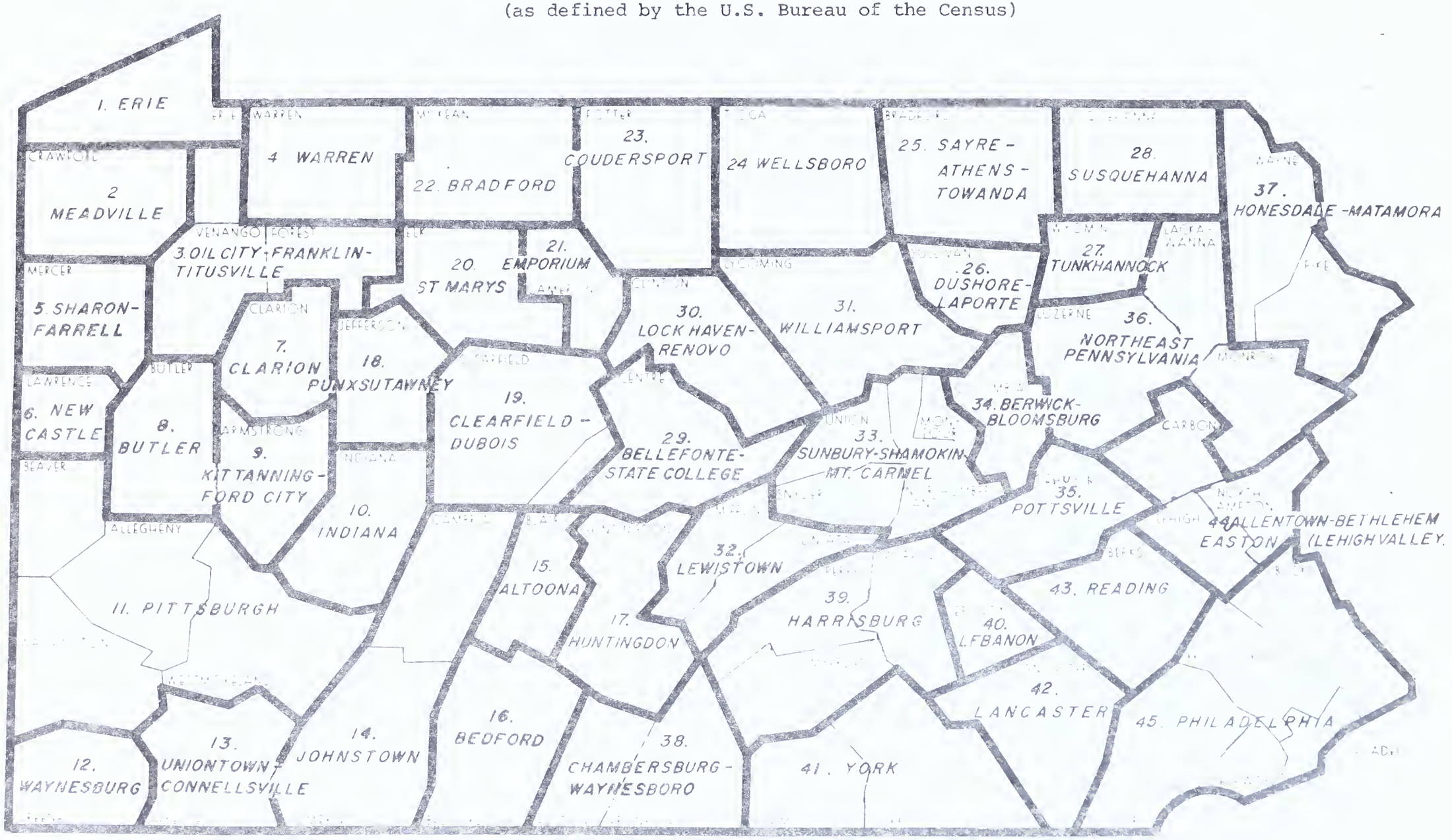


Table 2. Changes in Pennsylvania per Capita Personal Income, 1929 to 1973, with National Comparisons

Year	Per Capita Income		Pennsylvania as Percent of United States	Pennsylvania Percentage Change From Previous Year
	Pennsylvania	United States		
1929	$ 775	$ 703	110	
1930	716	621	115	- 7.6
1931	602	526	114	-15.9
1932	451	398	113	-25.1
1933	421	373	113	- 6.7
1934	482	421	114	14.5
1935	517	470	110	7.3
1936	599	531	112	15.9
1937	634	570	111	5.8
1938	562	524	107	-11.4
1939	599	553	108	6.6
1940	648	592	109	8.2
1941	771	716	108	19.0
1942	942	906	104	22.2
1943	1,133	1,099	103	20.3
1944	1,240	1,192	104	9.4
1945	1,268	1,231	103	2.3
1946	1,273	1,247	102	.4
1947	1,348	1,313	103	5.9
1948	1,446	1,417	102	7.3
1949	1,422	1,378	103	- 1.7
1950	1,566	1,487	105	10.1
1951	$1,747	$1,646	106	11.6
1952	1,835	1,720	107	5.0
1953	1,893	1,788	105	3.2
1954	1,785	1,768	101	- 5.7
1955	1,915	1,866	102	7.3
1956	2,008	1,940	103	4.9
1957	2,141	2,043	105	6.6
1958	2,127	2,057	103	- .7
1959	2,201	2,160	102	3.5
1960	2,256	2,217	102	2.5
1961	2,285	2,267	100	1.3
1962	2,373	2,368	100	3.9
1963	2,435	2,451	99	2.6
1964	2,588	2,579	100	6.3
1965	2,750	2,760	99	6.3
1966	2,968	2,963	100	7.9
1967	3,176	3,159	100	7.0
1968	3,413	3,421	100	7.5
1969	3,678	3,698	99	7.8
1970	3,943	3,943	100	7.2
1971	4,147	4,156	100	5.2
1972	4,447	4,478	99	7.2
1973	4,894	4,918	99	10.1

Source: Statistical Abstract of the United States.

Pennsylvania has been in the forefront of the highly developed states and a keystone in the country's economy. As far back as 1929, Pennsylvania's per capita income was larger than that of the United States. From 1929 to 1937 Pennsylvania's income was consistently higher than the national average by more than 10 per cent. However, this level of dominance has declined and disappeared entirely in 1963. After 1963 Pennsylvania per capita personal income was approximately equal to the national average (Table 2).

Pennsylvania's densely populated urban and industrial areas, mainly in the southeast and west, contrast sharply with its stagnating, generally rural areas, mainly in the middle section of the state. The excessive concentration of population and wealth in both the Philadelphia and Pittsburgh labor market areas produces this disparity. These two labor market areas with less than 10 per cent of the state's territory share 53 per cent of the state's total population and 58 per cent of the state's aggregate income, while Appalachia Pennsylvania excluding the Pittsburgh labor market area, with 73 per cent of the state territory has only 29 per cent of the total state population and 25 percent of the state aggregate income.

In recent decades, economic growth in Appalachia Pennsylvania has generally lagged behind the national rate of growth and has fallen short of the growth rate for the state as a whole. Population movements accompanied Appalachia Pennsylvania's economic setbacks. Most of labor market areas in the western part of the state have shared a common experience of losing population. Except for southeast Pennsylvania and four Appalachia Pennsylvania labor market areas, out-migration has occured in every Pennsylvania labor market areas.

II Patterens of Differential Changes in Per Capita Personal Income Among Areas

Economic growth is typified by shifts in the relative importance of industries: from agriculture to manufacturing and from manufacturing to services. Equally characteristic are changes in the relative importance of activities within the broad industrial groups, e.g., from textiles to automobiles, aircraft and electronics. The fact that natural resources are not homogeneously distributed geographically throughout an economy means that shifts in the importance of different activities, and consequential changes in relative resource demands, will generally be associated with shifts in the economic importance of different regions.

Changes in per capita personal incomes among labor market areas in Pennsylvania followed exactly the pattern of economic development as described. In the last half century some areas' personal income changed more, others' less, than the average. From 1929 to 1970 the relative position of labor market areas (ranked by the level of per capita personal income) has changed greatly. Labor market areas, such as Oil City-Franklin-Titusville, Kittaning-Ford City, Johnstown, Huntingdon, and Northeast Pennsylvania, with falls of relative position from 5 to 20, 6 to 26, 20 to 38, 29 to 42 and 15 to 26 respectively, all have experienced limitation on resources. Among these areas, some are isolated rural areas with a dominant agricultural economy, others are urbanized areas with dominant labor-intensive industries. Labor market areas, such as Butler, Wyoming, Pottsville, Chabersburg-Waynesboro, Lebanon and York, with raises of relative position from 31 to 19, 40 to 14, 37 to 21, 28 to 17, 21 to 9 and from 18 to 7 respectively, all have experienced great shifts from an agricultural to manufacturing economy.

To examine whether regional income inequalities are being reduced in Pennsylvania, a statistical empirical observation will be made based upon per capita personal income in each labor market area for selected historical years 1929 through 1971. In this observation W will be used as a measurement. Here W is a coefficient of variation, which measures the dispersion of the regional income per capita levels relative to the state average; the higher the W, the greater the relative imcone variation. This may be described by the formula

$$W = \frac{\sqrt{\frac{1}{P}\sum_{i} p_i (Y_i - \bar{Y})^2}}{\bar{Y}}$$

where P_i - population of ith labor market area,

P - $\sum P_i$, the state population,

Y_i - per capita personal income of the ith labor market area, and

$\bar{Y}$ - $\frac{1}{P}\sum P_i Y_i$, state personal income per capita.

In this study no adequate data is available to determine whether regional income inequality in Pennsylvania has experienced a trend of growth and then decline. The earliest available data for personal income by labor market area are estimates for 1929, and in 1929 Pennsylvania was already a highly developed state. Also from 1929 to 1965 the annual data are not in sequence.

As shown in Table 3, starting at a level of 24.3 percent in 1929, the coefficients of variation in Pennsylvania have decreased to 14.6 percent in 1950, increased slightly from 1950 to 1959 and then decreased steadily through 1971. In 1971 the coefficient was 12.1 percent. As we can expect there is

Table 3. Variations in Per Capita Personal Income Among Labor Market Areas in Pennsylvania, Selected Years From 1929 to 1971

Year	Mean[1] Personal Income	Standard Deviation From Mean[2]	Coefficient of Variation[3]
1929	$ 767	$ 186	24.3%
1940	641	152	23.7
1950	1,543	226	14.6
1959	2,265	348	15.4
1962	2,371	360	15.2
1965	2,749	402	14.6
1966	2,982	426	14.3
1967	3,173	430	13.5
1968	3,402	459	13.4
1969	3,688	473	12.8
1970	3,942	479	12.1
1971	4,147	503	12.1

[1] Data for mean personal income taken from Table 1.

[2] Standard deviation is computed as the square root of the average of the squared deviation from the mean personal income.

[3] Standard deviation expressed as percent of the mean personal income.

a pronounced tendency for the interregional coefficient of variation, one of the principal measures of relative dispersion, to decrease with an increase in income and to increase with a decrease in income because there is a variety of growth rates among areas. However, this tendency can be true only when areas with a lower level of income grow more or decline less and areas with higher level of income grow less or decline more. This can be easily seen by expressing each of the labor market areas' per capita incomes as a percentage of the state per capita income for the same year.

The labor market areas' relatives contained in Table 4 facilitate comparisons among labor market areas. From 1929 to 1971 there has been a tendency for the relative personal income per capita of labor market areas to converge toward that of the state. As personal income per capita for the state has risen, per capita personal income in each labor market area has come nearer to the state average in percentages.* In 1929 per capita personal income ranged from 125 percent of the state average in Philadelphia to 38 percent of the state average in Bedford. In 1971 per capita personal income ranged from 113 percent of the state average in Philadelphia to 70 per cent of the state average in Dushore-Laporte. Nevertheless, it should be noted that the current dollar differentials between per capita personal income in each labor market area and the state average have not converged. The absolute differential of per capita personal income in Bedford from the state average in 1929 was $474, while that of Philadelphia was $194. The absolute differential of per capita personal income in Dushore-Laporte from

*The increase of personal income in Emporium from 108.3 percent in 1929 to 180.1 percent in 1940 of the state average in the corresponding period was an exception.

Table 4. Labor Market Area Personal Income as Percent of the State Average, by Selected Years from 1929 to 1971

Labor Market Area	1929	1940	1950	1959	1962	1965	1966	1967	1968	1969	1970	1971
1. Erie*	97.7%	103.4%	106.6%	89.6%	95.7%	99.5%	97.4%	95.2%	92.5%	91.8%	93.9%	95.2
2. Meadville	80.1	87.0	81.4	82.4	82.6	85.2	88.5	89.6	86.6	86.1	86.3	85.6
3. Oil City-Franklin	104.0	81.1	84.3	78.1	78.4	81.3	79.2	81.0	82.1	82.5	87.5	87.2
4. Warren	84.5	78.9	85.1	82.6	88.2	92.8	93.2	96.3	96.6	96.2	97.1	95.2
5. Sharon-Farrell	85.0	90.4	106.6	101.8	101.1	103.1	102.7	101.9	99.5	97.3	95.5	95.2
6. New Castle	82.3	81.5	100.9	89.0	95.4	95.3	94.3	95.5	91.3	93.1	90.8	91.7
7. Clarion	51.0	54.9	66.2	71.2	74.7	70.0	70.6	73.1	77.1	78.9	81.0	82.9
8. Butler	60.2	75.0	83.2	87.8	90.1	95.6	92.7	94.2	87.8	87.8	88.0	87.3
9. Kittanning-Ford City	104.0	81.1	84.3	70.8	77.9	76.8	83.8	81.7	78.9	78.3	77.1	77.4
10. Indiana	59.5	65.5	78.4	72.2	70.6	68.5	68.3	72.0	68.5	71.2	74.7	74.7
11. Pittsburgh*	115.1	114.1	107.9	105.2	105.7	106.5	104.6	104.4	104.5	103.3	103.1	103.5
12. Waynesburgh	60.3	65.6	77.9	67.4	62.7	66.9	67.6	69.1	67.4	69.7	74.8	70.5
13. Uniontown-Connellsville	50.1	53.8	70.7	67.2	69.4	69.3	67.9	70.0	68.5	69.9	72.4	73.5
14. Johnstown*	73.7	79.7	76.2	69.1	72.4	75.1	73.9	73.0	73.2	73.9	76.1	76.1
15. Altoona*	81.4	88.1	83.9	80.3	81.1	82.4	79.1	79.8	81.8	83.4	84.5	84.6
16. Bedford	38.2	43.9	51.9	61.5	59.4	60.5	60.6	66.3	71.8	74.6	75.1	75.4
17. Huntingdon	63.6	58.5	73.2	61.1	64.9	69.9	71.0	75.3	74.3	73.2	72.9	73.9
18. Punxsutawney	52.4	62.5	76.1	71.6	76.0	71.9	71.7	72.3	75.2	76.0	78.8	80.2
19. Clearfield-Du Bois	56.4	64.4	72.6	68.0	67.5	69.6	71.4	76.2	75.2	74.8	77.3	78.3
20. St. Marys	69.8	80.8	98.7	87.5	92.4	88.5	92.9	95.1	93.0	90.4	89.7	88.7
21. Emporium	108.3	180.1	171.0	126.3	91.8	104.3	107.7	122.9	109.1	112.6	106.1	99.9
22. Bradford	112.1	95.0	96.4	83.2	98.4	96.9	100.4	105.5	94.1	95.5	93.2	92.0
23. Coudersport	49.2	50.3	59.8	59.1	69.8	71.2	71.8	75.0	75.5	76.8	78.6	73.1
24. Wellsboro	53.0	60.8	74.2	73.3	74.0	67.8	69.4	71.5	71.2	71.0	72.2	70.8
25. Sayre-Athens-Towanda	67.9	68.3	75.3	73.1	72.3	73.2	74.6	82.6	80.1	80.7	81.1	78.6
26. Dushore-Laporte	54.2	49.7	67.4	62.4	61.8	62.9	63.1	67.5	73.7	73.4	72.3	70.4
27. Tunkhannock	52.4	55.2	59.3	63.3	65.1	62.2	62.8	74.6	95.4	96.4	91.4	88.9
28. Susquehanna*	70.0	70.0	69.9	70.0	73.6	75.2	76.5	79.1	80.5	79.7	79.0	76.1
29. Bellefonte-State College	55.1	61.1	77.4	66.8	73.3	68.5	70.0	73.6	77.1	76.7	76.5	76.9
30. Lock Haven-Renovo	65.9	73.6	83.9	79.4	76.4	80.1	83.5	85.4	81.8	84.7	79.8	80.3
31. Williamsport*	85.9	85.3	94.1	86.9	88.6	88.5	90.3	93.5	92.2	90.8	91.0	90.0
32. Lewistown	65.7	69.7	81.0	75.9	78.9	83.1	83.0	87.4	87.5	87.1	86.9	88.4
33. Sunbury-Shamokin	67.0	61.6	78.4	72.0	75.2	76.6	77.0	80.8	82.0	83.7	85.5	84.6
34. Berwick-Bloomsburg	58.0	65.2	78.0	77.5	84.0	72.4	74.8	77.5	83.1	84.3	83.9	82.0
35. Pottsville	55.0	53.1	72.4	73.6	76.1	80.7	79.1	81.3	83.6	85.5	87.0	88.0

Table 4. Labor Market Area Personal Income as Percent of the State Average, by Selected Years from 1929 to 1971

Labor Market Area	1929	1940	1950	1959	1962	1965	1966	1967	1968	1969	1970	1971
36. Northeast Pennsylvania*	82.5%	73.9%	80.8%	77.8%	81.1%	80.1%	79.2%	82.1%	83.4%	83.7%	84.5%	85.8%
37. Honesdale-Matamoras	58.9	53.8	65.1	68.9	67.8	65.0	65.7	73.1	78.1	79.6	81.9	74.3
38. Chambersburg-Waynesboro	65.4	73.0	88.5	80.5	85.7	89.2	91.3	95.0	90.7	91.3	90.1	88.6
39. Harrisburg*	100.1	108.2	103.3	98.2	99.4	96.1	92.9	95.5	96.1	98.3	99.7	101.6
40. Lebanon	70.1	79.8	94.1	95.0	93.6	91.8	90.8	91.5	95.3	97.0	97.3	94.1
41. York*	81.2	84.7	101.0	91.5	93.1	93.2	91.5	93.7	95.3	97.3	99.5	90.7
42. Lancaster*	86.5	90.6	103.6	96.2	100.6	101.6	99.7	97.4	96.0	97.2	97.6	96.0
43. Reading*	100.6	101.2	104.6	97.5	99.5	104.5	101.4	102.4	103.2	103.6	103.1	103.3
44. Allentown-Bethlehem-Easton*	101.9	105.6	108.2	93.8	101.5	109.2	102.4	99.8	100.9	101.5	102.3	101.7
45. Philadelphia*	125.2	124.6	112.0	111.9	115.5	113.6	113.1	113.9	114.3	113.9	112.8	113.1

Source: Table 1

the state average in 1971 was $1,228, while that of Philadelphia was $545.

Short-run fluctuations of personal income in the individual labor market areas of Pennsylvania can be observed only for the period since 1965 because annual data in sequence are not available for previous periods. Since 1965 there has not been any significant business cycle, therefore from 1965 to 1971 the relative positions of the labor market areas remain about the same.

There is a well-marked increase relationship between a labor market area's 1929-1970 average income relative and the percentage change between its relatives in 1929 and in 1970. From Table 5, we can see that per capita personal incomes of the lower-income labor market areas have tended to increase, while per capita personal incomes of the higher income labor market areas have tended to decrease, relative to the state per capita personal income.* Since the labor market areas' differentials are continually shifting, the use of any single year as representative of a labor market area's income level would introduce a random element into these computations. To avoid this random element, the average for years 1929, 1940, 1950, 1959 and 1970 has been used to represent a labor market area's income level. The tendency in reducing the gap of interregional income difference among labor market areas is also expressed by Figure 3. In Figure 3 the area under the curve is proportional to the number of labor market areas, i.e., the larger the area under the curve the more the number of labor market areas covered by the curve. As shown in the

figure, the 1929's frequency distribution of labor market areas' income relatives to the state average is left-skewed. From the 1929's curve, a

* Economic gains for lower-income areas also shown in Fichtner, F. J., Jr. and F. L. Ou, Comparative Study of Economic Development in 67 Counties in Pennsylvania, Harrisburg, Pennsylvania: Governor's Office of State Planning and Development, February 1973.

Table 5. Labor Market Areas' Relatives of Pennsylvania Per Capita Personal Income, Average 1929-1970 Level and Percentage Changes From 1929 to 1970

	Relative of Pennsylvania Personal Income[1]	
	Average Level 1929-1970[2]	Percentage Change from 1929 to 1970[3]
Bedford	54.2%	36.9%
Coudersport	59.3	29.4
Dushore-Laporte	61.1	18.1
Uniontown-Connellsville	62.9	22.3
Tunkhannock	64.1	39.0
Clarion	64.8	30.0
Honesdale-Matamoras	65.8	23.0
Huntingdon	66.0	9.3
Wellsboro	66.6	19.2
Bellefonte-State College	67.3	21.4
Clearfield-Du Bois	67.7	20.9
Pottsville	68.2	32.0
Punxsutawney	68.4	26.4
Waynesburg	69.2	14.5
Indiana	70.1	15.2
Susquehanna*	71.8	9.0
Berwick-Bloomsburg	72.6	25.9
Sunbury-Shamokin	72.9	18.5
Sayre-Athens-Towanda	73.4	13.2
Johnstown*	75.0	2.4
Lewistown	76.0	21.2
Lock Haven-Renovo	76.6	13.9
Butler	78.8	27.8
Chambersburg-Waynesboro	79.4	24.7
Northeast Pennsylvania*	80.1%	2.0%
Meadville	83.2	6.2
Kittanning-Ford City	83.4	-26.9
Altoona*	83.5	3.1
St. Marys	85.5	19.9
Warren	85.5	12.6
Oil City-Franklin-Titusville	86.9	-16.5
Lebanon	87.3	27.2
Williamsport*	88.6	5.1
New Castle	89.0	8.5
York*	91.5	18.3
Lancaster*	95.1	11.1
Bradford	95.8	-18.9
Sharon-Farrell	95.9	10.5
Erie*	98.3	- 3.8
Reading*	101.6	2.5
Harrisburg*	101.7	- .4
Allentown-Bethlehem-Easton*	102.5	.4
Pittsburgh*	109.0	-12.0
Philadelphia*	117.4	-12.4
Emporium	138.2	- 2.2

[1]The basic data for this computation taken from Table 1 and Table 4 respectively .

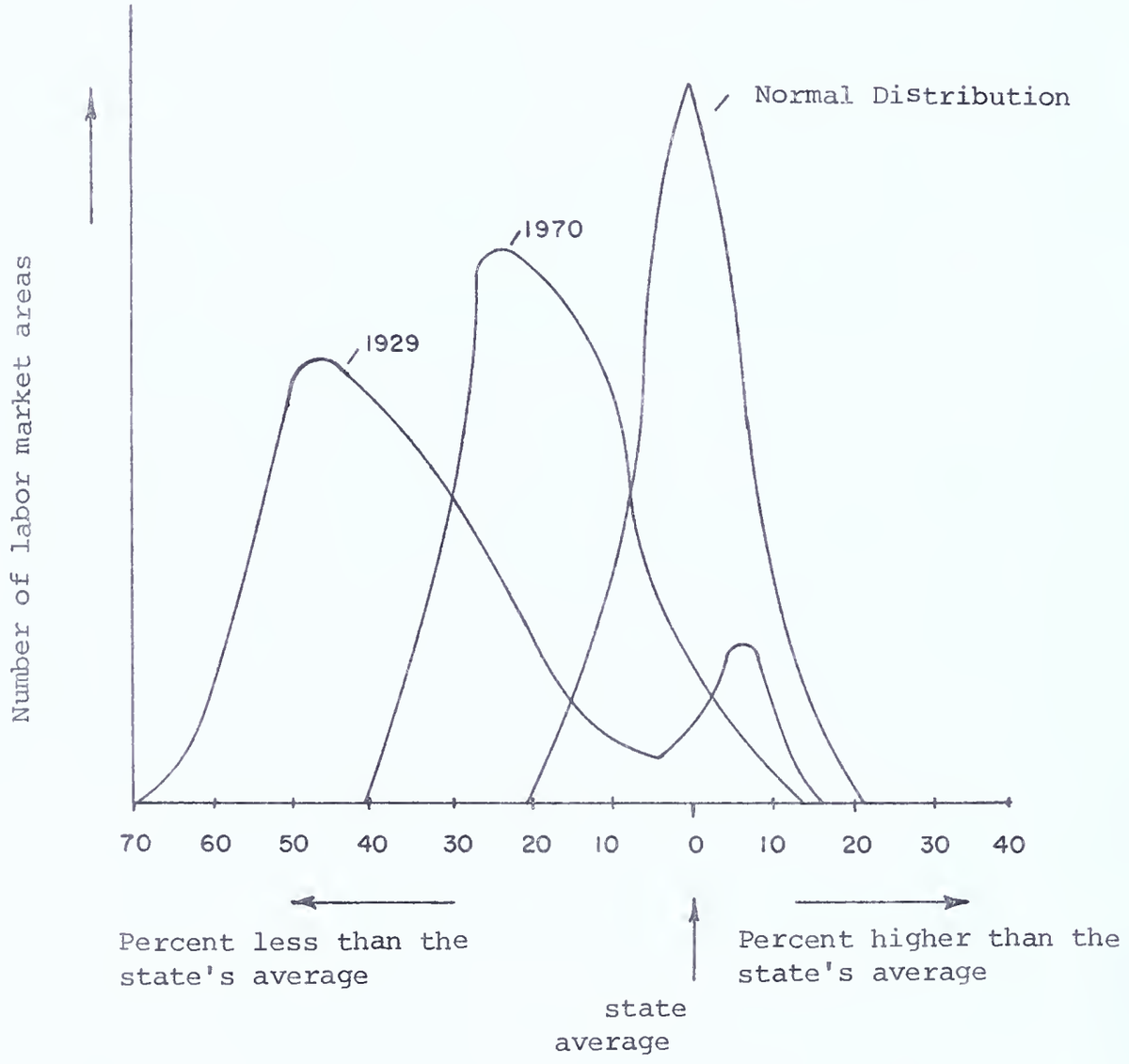
[2]The average level accounted only for the following years: 1929, 1940, 1950, 1959 and 1970.

[3]The negative sign shows the labor market areas growths rate lagging behind the State average.

*Metropolitan Labor Market Area.

Figure 3:

Frequency Distribution of Labor Market Areas Based on Their Income Relatives


Normal Distribution
1970
1929
Number of labor market areas
70 60 50 40 30 20 10 0 10 20 30 40
Percent less than the state's average
Percent higher than the state's average
state average

group of nine higher-income labor market areas contrasts sharply with a group of 24 lower-income market areas. Although the 1970 curve is still left-skewed, it shows the distribution much closer to the normal distribution. The normal distribution means that each labor market area's income is very close to the mean, or the state average.

Another aspect of income inequality is shown in intra regional income distribution. Since the function of the government is to promote the commonwealth of all its residents, income inequality among the people within a region is as important as interregional income inequality. Shown in Table 6 are differentials of the 1969 family income among income classes within each labor market area. The table shows an inverse relationship between the level of family income and the intraregional income inequality, i.e., intraregional income inequality tends to be large in the rural areas and to be small in the urbanized areas. The six labor market areas with the highest coefficients of variation are Honesdale-Matamoras with 136.4 percent, Lewistown, 102.2 percent, Dushore-Laporte, 96.2 percent, Uniontown-Connellsville, 84.7 percent, New Castle, 79.0 percent and Bedford 78.9 percent. The coefficients for the rest of labor market areas ranged from 64.1 percent in Emporium to 75.2 percent in Bellefonte-State College. The coefficient for the state average is 70.9 percent for the sate urban, 72.1 percent for the state rural nonfarm, 68.7 pervent and for the state rural farm, 79.0 percent. In general terms, for population groups or labor market areas with more income from wages and salaries their income differentials tend to be small and income classes or labor market areas with more income from other sources their income differentials tend to be large.

Table 6. Variation in Family Income Distribution Among Income Classes, for Labor Market Areas in Pennsylvania, 1969

Labor Market Area	Mean Family Income[1]	Standard Deviation From Mean[2]	Coefficient of Variation[3]
1. Erie*	$ 10,404	$ 7,242	69.6%
2. Meadville	9,323	6,370	68.3
3. Oil City-Franklin	8,843	5,927	67.0
4. Warren	10,066	6,935	68.9
5. Sharon-Farrell	9,898	6,566	66.3
6. New Castle	9,254	7,310	79.0
7. Clarion	8,295	5,874	70.8
8. Butler	9,559	6,241	65.3
9. Kittanning-Ford City	8,531	5,733	67.2
10. Indiana	9,094	6,686	73.5
11. Pittsburgh*	11,176	7,986	71.4
12. Waynesburg	7,589	5,522	72.7
13. Uniontown-Connellsville	7,594	6,433	84.7
14. Johnstown*	9,255	6,647	71.8
15. Altoona*	9,166	6,529	71.2
16. Bedford	8,484	6,692	78.9
17. Huntingdon	8,126	5,807	71.5
18. Punxsutawney	8,144	5,895	72.4
19. Clearfield-Du Bois	8,064	5,726	71.0
20. St. Marys	9,087	6,480	71.3
21. Emporium	10,251	6,578	64.1
22. Bradford	9,131	6,351	69.5
23. Coudersport	8,019	5,966	74.4
24. Wellsboro	8,448	5,943	70.3
25. Sayre-Athens-Towanda	9,131	6,351	69.5
26. Dushore-Laporte	8,441	8,125	96.2
27. Tunkhannock	8,444	5,692	67.4
28. Susquehanna	8,850	6,217	70.2
29. Bellefonte-State College	10,113	7,610	75.2
30. Lock Haven-Renovo	8,572	5,550	64.7
31. Williamsport*	9,389	6,379	67.9
32. Lewistown	8,662	8,856	102.2
33. Sunbury-Shamokin	8,362	5,787	69.2
34. Berwick-Bloomsburg	8,611	5,719	66.4
35. Pottsville	8,080	5,393	66.7
36. Northeast Pennsylvania*	9,356	6,685	71.4
37. Honesdale-Matamoras	8,780	11,977	136.4
38. Chambersburg-Waynesboro	9,036	6,145	68.0
39. Harrisburg*	11,186	7,768	69.4
40. Lebanon	10,386	6,773	65.2
41. York*	10,630	7,645	71.9
42. Lancaster*	11,017	7,563	68.6
43. Reading*	11,058	7,284	65.8
44. Allentown-Bethlehem-Easton*	11,285	7,429	65.8
45. Philadelphia*	12,269	8,792	71.6
Pennsylvania Total	10,877	7,718	70.9
Urban	11,247	8,113	72.1
Rural Nonfarm	9,957	6,848	68.7
Rural Farm	10,071	7,963	79.0

[1] Mean family income as reported in the 1970 Census of Population.

[2] Standard deviation is computed as the square root of the average deviation from the mean personal income. In computing standard deviation for the mean income, mid-point of income class intervals were used with the following exceptions. For the class interval 0 - $1,000 a mean family income of $1,000 was assumed. For the class interval $50,000 and over a mean family income of $50,000 was assumed.

[3] Standard deviation expressed as percent of the mean family income. The higher the value of the coefficient of variation the greater will be the income inequality within a given labor market area.

* Metropolitan Labor Market Areas.

In generally speaking, Pennsylvania is one of states in the United States having less regional income inequality. However, in the last two decades the trend toward a regional income inequality in Pennsylvania has been slower than the national trend. The rank of Pennsylvania among states with the least regional inequality has fallen from the nineth state in 1950 to the eighteenth in 1960.* Table 3 shows that during the 1950-1970 period the coefficient of variation from the mean income among labor market areas dropped 9.1 per cent from 1940 to 1950, and 3.3 per cent from 1959 to 1970, but remained the same from 1970 to 1971.

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* For the comparision of regional income inequality in Pennsylvania with that in the other states standard deviations from the mean income were computed for only forty-six states. For Pennsylvania the coefficient of variation was 13.5 per cent in 1950, 13.8 in 1960 and 1970 respectively. It should be noted that these coefficients of variation were computed by mean family income and by county, therefore they are not equal to the coefficients as shown in Table 3. For the detail refer to Williamson, op. cit., p.p. 18-32.

III. Income Components

The classification of personal income is based on the type of service for which the income payment is made. As shown in Table 7 personal income is regarded as the sum of the flows of labor income, proprietor's income (farm and nonfarm), proeprty income and transfer payments. In this section the interregional differentials in these flows will be examined.

The interregional differentials in the component income flows provide one means of determining the sources of some of the observed differences in the interregional behavior of personal income. As we can see from Table 7 the relative flow of labor income is larger in the highly urbanized labor market areas than in the sparsely populated and farm oriented labor market areas. Among the latter, the flow of proprietors' income is relatively large. Five out of the six labor market areas with per capita labor income higher thatn the state average are metropolitan labor market areas. On the other hand, among the sixteen ranking labor market areas in proprietors' income only one of them is highly urbanized. Both property income and transfer payments have no specific relationship to the level of development. Recipients of property income choose their place of residence, at least to some extent, without regard to the location of the property or business activity producing the income. Some transfer payments, such as unemployment insurance or workmen's compensation, are distributed with a requirement of close proximity of the receipient's residence and his usual industrial activity while other transfer payments, such as old-age pensions and veteran's benefits, may be distributed without residence requirements.

The differentials in the 1970 components, ranging from $31 per capita farm proprietors' income to $2,687 per capita labor income component, make it difficult to determine by inspection which of the components varies

Table 7. Per Capita Personal Income, by Income Component, for Labor Market Areas in Pennsylvania, 1970

Labor Market Area	Total Per Capita Personal Income	Components of Per Capita Personal Income					
		Labor Income	Proprietors Income			Property Income	Transfer Payments
			Total	Farm	Nonfarm		
1. Erie*	$ 3,700	$ 2,616	$ 290	$ 66	$ 224	$ 400	$ 394
2. Meadville	3,402	2,114	376	142	234	488	424
3. Oil City-Franklin	3,449	2,266	218	20	198	521	443
4. Warren	3,828	2,526	267	64	203	636	399
5. Sharon-Farrell	3,766	2,520	303	60	243	540	403
6. New Castle	3,580	2,325	294	30	264	526	435
7. Clarion	3,192	1,953	334	82	252	482	423
8. Butler	3,469	2,278	275	36	239	558	358
9. Kittanning-Ford City	3,039	1,743	262	46	216	556	478
10. Indiana	2,946	1,828	285	65	220	431	402
11. Pittsburgh*	4,065	2,784	248	5	243	601	432
12. Waynesburg	2,950	1,804	224	48	176	395	527
13. Uniontown-Connellsville	2,855	1,660	281	12	269	390	524
14. Johnstown*	2,998	2,065	254	54	200	239	440
15. Altoona*	3,332	2,148	217	31	186	506	461
16. Bedford	2,962	1,706	365	119	246	479	412
17. Huntingdon	2,872	1,737	289	99	190	418	428
18. Punxsutawney	3,108	1,881	292	49	243	471	464
19. Clearfield-Du Bois	3,047	1,890	249	19	230	456	452
20. St. Marys	3,534	2,416	180	4	176	553	385
21. Emporium	4,183	2,851	401	1	400	525	406
22. Bradford	3,675	2,263	311	23	288	616	485
23. Coudersport	3,098	1,494	637	365	272	522	445
24. Wellsboro	2,847	1,604	426	183	243	417	400
25. Sayre-Athens-Towanda	3,198	1,934	399	193	206	463	402
26. Dushore-Laporte	2,850	1,598	360	76	284	454	438
27. Tunkhannock	3,602	2,063	386	159	227	748	405
28. Susquehanna*	3,116	2,002	332	200	132	432	350
29. Bellefonte-State College	3,016	1,972	220	62	158	496	326
30. Lock Haven-Renovo	3,146	2,028	210	56	154	450	458

Table 7. Per Capita Personal Income, by Income Component, for Labor Market Areas in Pennsylvania, 1970 (Continued)

Labor Market Area	Total Per Capita Personal Income	Components of Per Capita Personal Income					
		Labor Income	Proprietors Income			Property Income	Transfer Payments
			Total	Farm	Nonfarm		
31. Williamsport*	$ 3,588	$ 2,348	$ 262	$ 51	$ 211	$ 562	$ 416
32. Lewistown	3,424	2,159	382	159	223	485	398
33. Sunbury-Shamokin	3,371	2,123	281	76	205	524	443
34. Berwick-Bloomsburg	3,308	2,041	299	89	210	492	475
35. Pottsville	3,429	2,139	297	26	271	501	492
36. Northeast Pennsylvania*	3,331	2,205	221	11	210	435	470
37. Honesdale-Matamoras	3,227	1,802	446	153	293	521	458
38. Chambersburg-Waynesboro	3,551	2,310	311	139	172	543	387
39. Harrisburg*	3,930	2,784	232	42	190	474	440
40. Lebanon	3,835	2,594	300	75	225	561	380
41. York*	3,921	2,824	297	86	211	440	359
42. Lancaster*	3,848	2,663	422	174	248	422	341
43. Reading*	4,065	2,947	301	46	255	419	398
44. Allentown-Bethlehem-Easton*	4,033	2,767	260	24	236	568	438
45. Philadelphia*	4,447	3,090	300	5	295	613	444
Pennsylvania	3,942	2,687	280	31	249	543	432
Coefficient of Variation**	12.1%	15.1%	16.0%	145.0%	15.3%	16.2%	7.5%

* *The coefficient of variation is a measure of the degree of variation among areas.

SOURCE: Office of State Planning and Development, Pennsylvania Projection Series: Detailed Report on Income, Report No. 74, pps-3, November 1974.

most by labor market areas. From Table 8 we can see that there are considerable variations among labor market areas in each of components. When the interregional coefficient of variation for each of the components is computed, each of the components with the single exception of transfer payments has a larger relative interregional dispersion than does per capita personal income. The most disperse of the per capita components is property income with 16.2 percent of variation followed by proprietors' income with 16.0 percent labor income 15.1 percent and transfer payments, 7.5 percent. In proprietors' incomes, farm income has 145 percent of variation.

The interregional differences in per capita personal income make it difficult to ascertain, by inspection at least, whether, for example, a $2,784 per capita labor income is a larger component of Pittsburgh's per capita personal income than $2,065 of Johnstown's per capita personal income. By expressing each of the labor market area's 1970 components as a percentage of the average personal income for the same period, this difficulty can be overcome.

Table 8 shows that labor income tends to be a larger percentage and the rest of incomes smaller percentages of personal income in the higher-income labor market areas. The percentages of labor income to personal income range from 48.2 percent in the Coudersport labor market area to 72.5 percent in the Reading labor market area. Marked geographic concentrations are found for the percentage of farm component. Four labor market areas, all located in the northern part of the state, received 6 percent or more of personal income in the form of farm income. The Coudersport labor market area received 11.8 percent of personal income from farm proprietors' income while fourteen labor market areas received less

Table 8 - Percentage of Personal Income, by Component and by Labor Market Area, 1970

Labor Market Area	Total per Capita Personal Income	Components of Per Capita Personal Income					
		Labor Income	Proprietors' Income			Property Income	Transfer Payments
			Total	Farm	Nonfarm		
1. Erie*	100.0%	70.7%	7.9%	1.8%	6.1%	10.8%	10.6%
2. Meadville	100.0	62.1	11.1	4.2	6.9	14.3	12.5
3. Oil City-Franklin	100.0	65.7	6.3	.6	5.7	15.1	12.9
4. Warren	100.0	66.0	7.0	1.7	5.3	16.6	10.4
5. Sharon-Farrell	100.0	66.9	8.1	1.6	6.5	14.3	10.7
6. New Castle	100.0	64.9	7.2	.8	7.4	14.7	12.2
7. Clarion	100.0	61.2	10.5	2.6	7.9	15.1	13.2
8. Butler	100.0	65.7	7.9	1.0	6.9	16.1	10.3
9. Kittanning-Ford City	100.0	57.3	8.6	1.5	7.1	18.3	15.8
10. Indiana	100.0	62.0	9.7	2.2	7.5	14.6	13.7
11. Pittsburgh*	100.0	68.5	6.1	.1	6.0	14.8	10.6
12. Waynesburg	100.0	61.1	7.6	1.6	6.0	13.4	17.9
13. Uniontown-Connellsville	100.0	58.1	9.8	.4	9.4	13.7	18.4
14. Johnstown*	100.0	68.9	8.5	1.8	6.7	8.0	14.6
15. Altoona*	100.0	64.5	6.5	.9	5.6	15.2	13.8
16. Bedford	100.0	57.6	12.3	4.0	8.3	16.2	13.9
17. Huntingdon	100.0	60.5	10.1	3.5	6.6	14.5	14.9
18. Punxsutawney	100.0	60.5	9.4	1.6	7.8	15.2	14.9
19. Clearfield-DuBois	100.0	62.0	8.2	.6	7.6	15.0	14.8
20. St. Marys	100.0	68.4	5.1	.1	5.0	15.6	10.9
21. Emporium	100.0	68.2	9.6	.0	9.6	12.5	9.7
22. Bradford	100.0	61.6	8.4	.6	7.8	16.8	13.2
23. Coudersport	100.0	48.2	20.6	11.8	8.8	16.8	14.4
24. Wellsboro	100.0	56.4	14.9	6.4	8.5	14.6	14.1
25. Sayre-Athens-Towanda	100.0	60.5	12.4	6.0	6.4	14.5	12.6
26. Dushore-Laporte	100.0	56.1	12.7	2.7	10.0	15.9	15.3
27. Tunkhannock	100.0	57.3	10.7	4.4	6.3	20.8	11.2
28. Susquehanna*	100.0	64.3	10.6	6.4	4.2	13.9	11.2
29. Bellefonte-State College	100.0	65.4	7.3	2.1	5.2	16.5	10.8
30. Lock Haven-Renovo	100.0	64.4	6.7	1.8	4.9	14.3	14.6
31. Williamsport*	100.0	65.5	7.3	1.4	5.9	15.6	11.6
32. Lewistown	100.0	63.1	11.1	4.6	6.5	14.2	11.6
33. Sunbury-Shamokin	100.0	63.0	8.3	2.2	6.1	15.5	13.2
34. Berwick-Bloomsburg	100.0	61.7	9.0	2.7	6.3	14.9	14.4
35. Pottsville	100.0	62.4	8.7	.8	7.9	14.6	14.3

Table 8 - Percentage of Personal Income, by Component and by Labor Market Area, 1970

Labor Market Area	Total per Capita Personal Income	Components of Per Capita Personal Income					
		Labor Income	Proprietors' Income			Property Income	Transfe Payment
			Total	Farm	Nonfarm		
36. Northeast Pennsylvania*	100.0%	66.2%	6.6%	.3%	6.3%	13.1%	14.1
37. Honesdale-Matamoras	100.0	55.9	13.8	4.7	9.1	16.1	14.2
38. Chambersburg-Waynesboro	100.0	65.1	8.7	3.9	4.8	15.3	10.9
39. Harrisburg*	100.0	70.9	5.9	1.1	4.8	12.0	11.2
40. Lebanon	100.0	67.6	7.9	2.0	5.9	14.6	9.9
41. York*	100.0	72.0	7.6	2.2	5.4	11.2	9.2
42. Lancaster	100.0	69.2	10.9	4.5	6.4	11.0	8.9
43. Reading*	100.0	72.5	7.4	1.1	6.3	10.3	9.8
44. Allentown-Bethlehem-Easton*	100.0	68.6	6.4	.6	5.8	14.1	10.9
45. Philadelphia*	100.0	69.5	6.7	.1	6.6	13.8	10.0
Pennsylvania	100.0	68.1	7.1	.8	6.3	13.8	11.0

* Metropolitan Labor Market Area.

Source of Basic Data: Table 7.

than 1 percent of personal income from the farm component. The percentages for property income and transfer payments also had considerable relative interregional disperson. Property income varies from 8 percent in Johnstown to 20.8 percent in Tunkhannock, while transfer payments vary from 9.2 percent in York to 18.2 percent in Uniontown-Connellsville.

During the 1929-1970 period, labor incomes and transfer payments became an increasing, and property incomes a decreasing, percentage of personal income. (Table 9). From 1929 to 1941 labor income as the percentage of personal income has steadily increased from 63 percent to 70 percent. In twelve of the fourteen years, from 1941 to 1954, labor income accounted for more than 70 percent of personal income. From 1959 to 1970 there was a declining trend in the share of labor income. Transfer payments have increased from less than 2 percent in the 1929-1930 period to 11 percent in 1970. Property income, on the other hand, which was more than 24 percent of personal income in the period of 1929-1933 decreased in importance steadily during the period 1934-1944, and has varied within the narrow range of 12-14 percent of personal income during 1945-1970. Changes in proprietors' income are not significant. Farm income has decreased from 2 percent in 1929 to less than 1 percent in 1970. Nonfarm income decreased during the period of 1929-1933, increased from 1934-1946, and then declined through 1970. In 1970 nonfarm income accounted for 6.3 percent of the total personal income.

Table 9 - Percentage Distribution of Personal Income in Pennsylvania, by Component and by Year, 1929-1970

Year	Total Per Capita Personal Income	Components of Per Capita Personal Income					
		Labor Income	Proprietors' Income			Property	Transfer
			Total	Farm	Nonfarm		
1929	100.0%	63.1%	10.7%	2.1%	8.6%	24.5%	1.7%
1930	100.0	63.8	9.5	1.7	7.8	24.9	1.8
1931	100.0	62.0	8.8	2.0	6.8	25.6	3.7
1932	100.0	62.5	6.4	1.3	5.1	26.8	4.2
1933	100.0	63.7	7.1	2.1	5.0	24.5	4.8
1934	100.0	64.9	8.3	1.7	6.6	22.2	4.6
1935	100.0	65.0	10.1	2.7	7.4	19.5	5.4
1936	100.0	66.3	9.7	2.0	7.7	18.3	5.0
1937	100.0	67.7	10.3	2.4	7.9	18.6	3.5
1938	100.0	66.4	10.5	2.1	8.4	17.8	5.3
1939	100.0	66.8	10.2	1.8	8.4	18.0	5.0
1940	100.0	67.9	10.8	1.9	8.9	17.0	4.3
1941	100.0	70.2	11.6	1.9	9.7	15.0	3.2
1942	100.0	71.8	12.4	2.1	10.3	13.4	2.4
1943	100.0	73.4	12.8	2.1	10.7	11.7	2.0
1944	100.0	73.8	12.5	2.2	10.3	11.5	2.3
1945	100.0	71.5	12.9	2.2	10.7	11.8	3.9
1946	100.0	67.2	13.4	2.4	11.0	12.1	7.2
1947	100.0	70.5	11.4	2.1	9.3	11.9	6.2
1948	100.0	71.9	11.4	2.1	9.3	11.5	5.2
1949	100.0	70.2	11.1	1.8	8.3	12.4	6.3
1950	100.0	68.5	10.3	1.4	8.9	12.8	8.5
1951	100.0	72.4	10.4	1.7	8.7	12.2	5.1
1952	100.0	73.2	9.8	1.3	8.5	12.0	5.1
1953	100.0	74.1	9.0	1.1	7.9	12.0	5.0
1954	100.0	71.7	8.9	1.0	7.9	13.0	6.4
1959	100.0	70.3	9.4	N.A.	N.A.	12.4	7.9
1962	100.0	69.4	8.6	N.A.	N.A.	13.2	8.8
1965	100.0	69.4	8.4	N.A.	N.A.	14.1	8.1
1966	100.0	70.0	8.0	N.A.	N.A.	14.0	8.0
1967	100.0	68.3	8.3	.9	7.4	14.5	8.9
1968	100.0	68.5	7.7	.7	7.0	14.4	9.4
1969	100.0	69.2	7.4	.8	6.6	13.8	9.6
1970	100.0	68.1	7.1	.8	6.3	13.8	11.0

Note: N.A. - Data are not available.

Data Adapted From: Hanna, F. H., State Income Differentials, 1919-1954, Durham, N.C.: Duke University Press, 1959 Appendix C and Office of State Planning and Development, Pennsylvania Projection Series: Detailed Report on Income, Report No. 74, pps-3, November 1974.

IV. Industrial Earnings

A further investigation of interregional income differentials can be made from the industrial distribution of wage and salary income in various labor market areas. Since industrial activity produces varying employment opportunities, a labor market area's industrial structure and its occupational structure are interrelated. A labor market area with an industrial composition heavily weighted in the direction of capital-intensive, high value-added industries can be expected to provide relatively more employment opportunities for persons with highly developed skills than can a labor market area with an industrial composition heavily weighted in other directions.

In Pennsylvania, industrial composition varies widely among labor market areas. For example, in 1970 manufacturing accounted for less than 5 per cent in the Waynesburg labor market area, but accounted for more than 60 per cent (of all wages and salaries) in both the St. Marys and Emporium labor market areas. In the same period agricultural wages and salaries, which for Pennsylvania accounted for 1.2 per cent of all wages and salaries, accounted for less than on per cent in six labor market areas and for more than 10 per cent in four labor market areas. In 1970 mining wages and salaries were a negligible percentage of the state total wages and salaries, yet accounted for more than 50 per cent of all wages and salaries in the Waynesburg labor market area. The interregional range of shares of all wages and salaries accounted for by the trade and service industries, on the other hand, is confined within moderate limits. (Table 10).

When the relative interregional variation in the wages and salaries of each industry, expressed as a percentage of all wages and salaries, is measured by the coefficient of variation, mining and agriculture which differ in large part on the spotty distribution of mineral resources and agricultural land use, are clearly the most geographically dispersed among industries. These two industries had coefficients of variation of 684.9 per cent and 409.6 per cent respectively.

Table 10. Percentage Distribution of Labor Income by Industrial Sector for Labor Market Areas in Pennsylvania, 1970

	Total	Agriculture	Mining	Manufacturing	Construction	Transportation	Trade	Finance	Government	Services	Misc.
1. Erie*	100.0	2.4	.0	48.4	5.9	6.0	13.7	3.1	9.6	10.7	.2
2. Meadville	100.0	6.2	.4	42.7	5.2	6.6	12.6	2.1	11.0	12.8	.4
3. Oil City-Franklin	100.0	1.0	.5	44.9	3.8	7.7	12.9	3.0	15.9	10.2	.1
4. Warren	100.0	2.5	.4	45.6	2.1	6.6	15.6	1.9	17.1	8.0	.2
5. Shannon-Farrell	100.0	2.2	.4	54.2	4.0	5.9	12.0	2.0	8.2	11.0	.1
6. New Castle	100.0	1.5	1.7	39.8	4.6	9.4	13.9	3.5	10.8	14.7	.1
7. Clarion	100.0	4.1	7.1	28.8	8.0	9.5	16.4	1.6	16.6	7.4	.5
8. Butler	100.0	2.2	1.7	45.8	6.8	5.9	12.4	2.3	12.3	10.5	.2
9. Kittanning-Ford City	100.0	2.5	13.6	30.4	4.5	9.4	13.1	2.1	13.2	10.9	.4
10. Indiana	100.0	3.8	13.6	26.5	5.0	8.4	14.7	2.1	16.3	9.2	.4
11. Pittsburgh*	100.0	.2	1.4	37.2	6.7	7.9	15.7	4.2	10.5	16.1	.1
12. Waynesburg	100.0	2.4	50.5	4.7	1.4	7.4	8.4	1.2	14.6	9.0	.4
13. Uniontown-Connellsville	100.0	1.0	6.2	23.2	4.7	10.7	21.1	3.2	16.1	13.7	.1
14. Johnstown*	100.0	2.6	10.2	33.5	4.7	7.5	13.7	2.4	13.6	11.7	.1
15. Altoona*	100.0	1.4	.1	31.7	6.0	17.7	15.5	2.5	11.4	13.6	.1
16. Bedford	100.0	7.3	1.0	20.6	9.0	12.3	17.7	1.9	16.4	12.9	.8
17. Huntingdon	100.0	5.9	.5	37.4	6.2	5.4	13.2	3.2	17.1	11.0	.2
18. Punxsutawney	100.0	2.6	3.5	38.1	3.3	9.9	18.1	1.4	11.7	11.1	.4
19. Clearfield-Du Bois	100.0	1.1	19.3	28.5	5.7	10.5	15.9	3.1	13.9	11.0	.1
20. St. Marys	100.0	.2	.7	66.9	2.6	4.8	8.8	1.4	6.1	8.4	.1
21. Emporium	100.0	.1	.0	62.3	2.4	3.1	8.7	1.3	15.0	7.1	.0
22. Bradford	100.0	1.1	5.0	44.9	3.6	5.8	12.9	2.8	11.4	12.5	.1
23. Coudersport	100.0	20.8	1.4	19.0	6.6	7.3	11.3	1.7	19.3	12.0	.7
24. Wellsboro	100.0	11.3	2.3	27.9	2.4	9.9	13.2	2.2	19.7	10.6	.5
25. Sayre-Athens-Towanda	100.0	10.1	.1	39.8	2.8	6.8	12.9	2.4	13.4	11.4	.4

Table 10 (Continued)

	Total	Agriculture	Mining	Manufacturing	Construction	Transportation	Trade	Finance	Government	Services	Misc.
26. Dushore-Laporte	100.0	4.9	.4	25.9	6.8	3.0	14.9	1.5	33.9	7.5	1.1
27. Tunkhannock	100.0	6.7	2.7	48.9	5.5	3.7	11.3	1.1	11.0	8.6	.5
28. Susquehanna*	100.0	15.5	1.6	24.8	4.2	5.7	14.9	1.6	19.2	11.7	.8
29. Bellefonte-State College	100.0	2.8	1.2	21.3	8.1	3.9	11.8	1.9	34.7	14.0	.3
30. Lock Haven-Renovo	100.0	2.6	.1	49.6	3.1	8.5	11.9	2.0	13.0	9.0	.1
31. Williamsport*	100.0	1.9	.4	44.7	5.8	6.3	15.3	3.4	10.3	11.8	.1
32. Lewistown	100.0	6.8	.1	47.3	3.3	7.2	13.3	2.2	10.6	9.0	.2
33. Sunbury-Shamokin	100.0	3.6	1.5	39.7	5.4	6.8	13.4	2.6	14.7	12.1	.2
34. Berwick-Bloomsburg	100.0	4.2	.4	50.3	5.2	4.1	12.4	2.0	11.4	9.6	.4
35. Pottsville	100.0	1.4	6.9	42.1	5.3	6.7	13.0	2.6	11.3	10.4	.3
36. Northeast Pennsylvania*	100.0	.5	1.5	37.1	5.7	6.1	17.1	3.4	14.0	12.9	.2
37. Honesdale-Matamoras	100.0	8.2	.0	20.8	9.3	5.5	15.2	3.5	19.8	16.2	1.5
38. Chambersburg-Waynesboro	100.0	6.1	1.3	32.0	4.3	3.9	11.3	1.8	29.2	9.5	.6
39. Harrisburg*	100.0	1.4	.2	22.9	6.6	9.2	15.4	5.1	26.2	12.9	.1
40. Lebanon	100.0	3.2	3.0	42.3	3.5	5.5	14.2	1.8	16.3	10.0	.2
41. York*	100.0	3.3	.5	45.3	12.1	5.4	14.3	2.1	7.0	9.7	.3
42. Lancaster*	100.0	6.1	.4	45.8	6.2	5.2	14.8	2.4	7.9	10.9	.3
43. Reading*	100.0	1.7	1.1	46.6	5.0	6.2	13.5	3.8	8.7	13.2	.2
44. Allentown-Bethlehem-Easton*	100.0	.9	.3	49.5	5.4	7.9	13.4	3.1	7.2	12.1	.2
45. Philadelphia*	100.0	.2	.1	32.0	6.3	6.6	16.8	6.1	14.8	16.9	.2
Pennsylvania		1.2	1.2	36.3	6.2	7.1	15.6	4.4	13.2	14.6	.2
Coefficient of variation*		409.6%	684.9%	33.7%	36.5%	37.0%	19.1%	48.7%	48.4%	27.8%	156.2%

*The coefficient of variation is a measure of the degree of variation among areas.

The next group of industries, with coefficients of variation around 48 per cent, are the finance and government industries. The remaining industries, transportation, construction, manufacturing, service and trade coefficients ranged from 37 per cent to 19.1 per cent (last row of Table 10).

Within the framework of the state's economy there are wide variations in the average weekly earnings of production workers. A labor market area's labor earnings will be affected by the kinds of industries which are located in the labor market area, as well as by a number of other factors, such as occupational wage rates.

When industries are classified into three groups: the first group with high earning rates, the second group with medium earning rates and the third group with low earning rates, by using national average weekly earnings as a criteria (Table 11), we may compute the percentage distribution of industrial employment among the three groups. From this we can see a picture of the industrial structure of each labor market area. As shown in Table 12 the percentage distribution of manufacturing employment among the three groups varies from area to area. The share of manufacturing employment in group 1 ranges from less than 1 per cent to 71.5 per cent in group 2 from 17.0 per cent to 90.0 per cent, while in group 3 ranges from none to 60.2 per cent. When all the industrial employment is considered, the percentage distribution of employment among these three groups has less variation. This is revealed in Table 13. For the state average, the total industrial employment is about 30 per cent in group 1 and 35 per cent in each of groups 2 and 3, while the distribution of manufacturing employment among the three corresponding groups is 35 per cent, 48 percent and 17 per cent, respectively.

It seems clear that an area with a large per cent of employment in the high-earning groups has a better industrial composition. In manufacturing, for example, the percentage distribution of employment among the three groups (1,2,3) in Bellefonte-State College is 29.9 per cent, 64.7 per cent, and 5.4 per cent, and in Huntingdon 0.3 per cent, 62.1 per cent and 37.6 per cent respectively. From their distribution patterns we can easily recognize

Table 11. Average Weekly Earnings for Production or Nonsupervisory Workers, in all Nonagricultural Industries, United States, April 1970

SIC Code	Industries with High Earnings Rate	Average Weekly Earnings
17	Special Trade Contractors	$ 200.17
16	Other Construction - not building	193.44
12	Bituminous Coal & Lignite	186.26
11	Anthracite Mining	183.72
46	Pipe Line Transportation	183.51
15	General Building Construction	180.56
29	Petrol. Refin. & Related Ind.	179.77
78	Motion Pictures	174.15
49	Public Utilities	169.32
62	Security & Commodity Brokers	168.30
10	Metal Mining	164.31
33	Primary Metal Industries	157.56
37	Transportation Equipment	157.20
35	Machinery except Electrical	156.04
14	Mining of Nonmetalic Min.	154.69
40	Railroad Transportation	153.60
13	Crude Patrol. & Natural Gas	153.36
*92	State & Local Government	151.30
28	Chemicals & Allied Products	150.14

SIC Code	Industries with Medium Earnings Rate	Average Weekly Earnings
44	Water Transportation	$ 148.88
45	Transportation by Air	148.88
47	Transportation Service	148.88
27	Print., Publish., & Allied Industries	145.15
42	Motor Freight - Warehousing	142.63
34	Fabricated Metal Products	142.45
26	Paper & Allied Products	140.53
41	Local & Suburban Transit	139.28
32	Stone, Clay, Glass & Concrete.	138.28
50	Wholesale Trade	135.26
38	Science & Control. Instrum.	132.59
	Mean Average Weekly Earnings (U.S.A.)	131.38
48	Communication	129.15
36	Elec. Machin. Equip. & Supplies	128.70
30	Rubber & Misc. Plastic Products	127.03
20	Food & Kindred Products	124.18
63	Insurance Carriers	119.19
24	Lumber & Wood Prod. - Not Furniture	115.31
64	Insr. Agents, Brokers & Services	111.81
65	Real Estate	111.81
66	Fire & Law Offices	111.81
67	Holding & Investment Comp.	111.81
21	Tobacco Manufactures	110.93
52	Build. Mtl., Hardware, etc.	110.21
39	Miscellaneous	108.64
*91	Federal Government	106.36
25	Furniture & Fixtures	105.65
57	Furniture, Home Furnishings	104.83
61	Other Credit Agencies	103.79
60	Banking	101.75
55	Auto Dealers, Gas Service Stations	100.77
59	Misc. Retail Stores	100.77

SIC Code	Industries with Low Earnings Rate	Average Weekly Earnings
22	Textile Mill Products	$ 96.96
73	Misc. Business Services	96.26
75	Auto Repair & Services	96.26
76	Misc. Repair Services	96.26
79	Amusement & Recreation	96.26
80	Medical & Health Services	96.26
81	Legal Services	96.26
82	Educational Services	96.26
84	Museums, Art Gall., Gardens	96.26
86	Nonprofit Organizations	96.26
88	Private Households	96.26
89	Misc. Services	96.26
31	Leather & Leather Products	90.62
72	Personal Services	88.20
54	Food Stores	85.22
23	Apparel & Fin. Fabricate Products	83.90
53	General Merchandise	73.83
56	Apparel & Accessory Stores	69.33
58	Eating and Drinking Places	56.18
70	Hotels - Lodging Places	66.89

Source: U. S. Department of Labor - Bureau of Labor Statistics, Employment and Earnings, Vol. 16, No. 1, July 1970, Table C-2.
* Estimated average weekly earnings (Federal Government included military).

in Pennsylvania, by Industrial Group and by Labor Market Area, 1970

Labor Market Area	Total	Group 1	Group 2	Group 3
1. Erie*	100.0%	36.8%	62.7%	.5%
2. Meadville	100.0	44.3	55.7	.0
3. Oil City-Franklin	100.0	71.5	28.2	.3
4. Warren	100.0	31.9	68.1	.0
5. Sharon-Farrell	100.0	56.7	43.0	.3
6. New Castle	100.0	54.2	43.0	2.8
7. Clarion	100.0	10.0	90.0	.0
8. Butler	100.0	70.9	26.7	2.4
9. Kittanning-Ford City	100.0	16.4	77.9	5.7
10. Indiana	100.0	2.9	83.1	14.0
11. Pittsburgh*	100.0	55.4	43.3	1.3
12. Waynesburg	100.0	16.3	31.2	52.5
13. Uniontown-Connellsville	100.0	20.6	63.6	15.8
14. Johnstown*	100.0	56.4	17.0	26.6
15. Altoona*	100.0	11.6	58.7	29.7
16. Bedford	100.0	23.7	35.0	41.3
17. Huntingdon	100.0	.3	62.1	37.6
18. Punxsutawney	100.0	11.1	69.4	19.5
19. Clearfield-Du Bois	100.0	10.5	62.6	26.9
20. St. Marys	100.0	23.1	76.9	.0
21. Emporium	100.0	19.7	80.3	.0
22. Bradford	100.0	15.2	82.3	2.5
23. Coudersport	100.0	6.2	86.7	7.1
24. Wellsboro	100.0	6.4	62.5	31.1
25. Sayre-Athens-Towanda	100.0	49.6	40.4	10.0
26. Dushore-Laporte	100.0	.3	37.0	62.7
27. Tunkhannock	100.0	1.5	76.4	22.1
28. Susquehanna*	100.0	40.2	22.3	37.5
29. Bellefonte-State College	100.0	29.9	64.7	5.4
30. Lock Haven-Renovo	100.0	41.1	37.1	21.8
31. Williamsport*	100.0	20.3	55.6	24.1
32. Lewistown	100.0	61.2	23.0	15.8
33. Sunbury-Shamokin	100.0	20.7	44.0	35.3
34. Berwick-Bloomsburg	100.0	13.9	42.4	43.7
35. Pottsville	100.0	19.5	20.3	60.2
36. Northeast Pennsylvania*	100.0	9.8	47.5	42.7
37. Honesdale-Matamoras	100.0	1.9	40.9	57.2
38. Chambersburg-Waynesboro	100.0	42.1	25.8	32.1
39. Harrisburg*	100.0	29.2	49.1	21.7
40. Lebanon	100.0	21.6	42.8	35.6
41. York*	100.0	21.8	57.0	21.2
42. Lancaster*	100.0	22.0	56.2	21.8
43. Reading*	100.0	34.8	37.9	27.3
44. Allentown-Bethlehem-Easton*	100.0	30.8	36.3	32.9
45. Philadelphia*	100.0	33.3	51.9	14.8
Pennsylvania	100.0	34.9	47.7	17.4

Note: The classification of manufacturing industrial group was based on the following weekly earning ranges.
Group 1: Industries with average weekly earnings of $150.14 - 200.17.
Group 2: Industries with average weekly earnings of $100.77 - 148.88.
Group 3: Industries with average weekly earnings of $66.89 - 96.96.
For more detail refer to Table 11.

Source of Basic Data: Office of State Planning and Development, Pennsylvania Projection Series - Employment, Report No. 73, pps-2, November 1973.

Table 13 - Percentage Distribution of All Industrial Employment in Pennsylvania by Industrial Group and by Labor Market Area, 1970

Labor Market Area	Total	Group 1	Group 2	Group 3
1. Erie*	100.0%	30.4%	42.9%	26.7%
2. Meadville	100.0	37.3	36.3	26.4
3. Oil City-Franklin	100.0	50.0	26.9	23.1
4. Warren	100.0	33.4	37.9	28.7
5. Sharon-Farrell	100.0	40.3	34.3	25.4
6. New Castle	100.0	36.9	32.3	30.8
7. Clarion	100.0	37.2	40.3	22.5
8. Butler	100.0	45.9	29.2	24.9
9. Kittanning-Ford City	100.0	34.6	38.0	27.4
10. Indiana	100.0	38.1	34.6	27.3
11. Pittsburgh*	100.0	35.0	32.3	32.7
12. Waynesburg	100.0	63.7	12.0	24.3
13. Uniontown-Connellsville	100.0	31.6	34.2	34.2
14. Johnstown*	100.0	44.9	20.0	35.1
15. Altoona*	100.0	28.8	33.1	38.1
16. Bedford	100.0	27.9	30.4	41.7
17. Huntingdon	100.0	23.1	39.0	37.9
18. Punxsutawney	100.0	24.7	41.8	33.5
19. Clearfield-Du Bois	100.0	29.7	37.6	32.7
20. St. Marys	100.0	23.9	56.9	19.2
21. Emporium	100.0	28.9	53.0	18.1
22. Bradford	100.0	27.8	46.2	26.0
23. Coudersport	100.0	34.4	37.5	28.1
24. Wellsboro	100.0	33.6	32.0	34.4
25. Sayre-Athens-Towanda	100.0	38.0	30.9	30.1
26. Dushore-Laporte	100.0	29.2	27.6	43.2
27. Tunkhannock	100.0	18.8	50.8	30.4
28. Susquehanna*	100.0	35.5	25.4	39.1
29. Bellefonte-State College	100.0	54.8	22.2	23.0
30. Lock Haven-Renovo	100.0	40.2	26.2	33.6
31. Williamsport*	100.0	24.6	42.6	32.8
32. Lewistown	100.0	41.6	27.3	31.1
33. Sunbury-Shamokin	100.0	28.9	32.5	38.6
34. Berwick-Bloomsburg	100.0	22.5	35.0	42.5
35. Pottsville	100.0	30.4	22.7	46.9
36. Northeast Pennsylvania*	100.0	20.3	35.5	44.2
37. Honesdale-Matamoras	100.0	28.9	26.3	44.8
38. Chambersburg-Waynesboro	100.0	31.0	35.4	33.6
39. Harrisburg*	100.0	32.9	35.6	31.5
40. Lebanon	100.0	24.9	38.1	36.9
41. York*	100.0	25.0	41.0	34.0
42. Lancaster*	100.0	23.3	39.8	36.9
43. Reading*	100.0	31.1	31.5	37.4
44. Allentown-Bethlehem-Easton*	100.0	28.9	31.5	39.6
45. Philadelphia*	100.0	24.8	38.3	36.9
Pennsylvania	100.0	29.4	35.4	35.3

Note: The classification of industrial groups was based on the following weekly earning ranges:
Group 1 - Industries with average weekly earnings $150.14 - 200.17
Group 2 - Industries with average weekly earning $100.77 - 148.88
Group 3 - Industries with average weekly earnings $66.89 - 96.96
For more detail refer to Table 11.

Source of Basic Data: Office of State Planning and Development, Pennsylvania Projection Series - Employment, Report No. 73, pps-2, November 1973.

that the former has a more favorable manufacturing composition than the latter. However, we cannot say that Philadelphia's industrial composition with 33.3 per cent, 51.9 per cent and 14.8 per cent in the corresponding groups is less favorable than that of Bellefonte State College. For a comparison of industrial composition among labor market areas we have to derive another index which represents the complexity of each labor market areas' industries.

By weighting the number of workers in each industry in a labor market by the national average weekly earnings per worker in the industry, it is possible to compute for a labor market area a weighted average weekly earnings. The computed average weekly earnings will differ from the national average weekly earnings to the extent that labor market areas and national industrial compositions differ. Since weekly industrial earnings have been held constant in the computation, the resulting figures have been designated the rate-constant earnings.

As shown in column 2 of Table 14, the rate-constant earnings were computed by using the U.S. April 1970 average weekly earnings (Table 11). In the U.S. report the average earnings did not include government sectors, therefore a direct comparison between the computed labor market area's and reported national average weekly earnings is improper. The comparison between a labor market area's rate-constant weekly earning with that of the state was made. From this comparison a measure can be obtained for observing the differentials in industrial compositions among the labor market areas (Table 14, col. 3). Since the same set of weights has been used in computing the labor market area's rate-constant weekly earnings, they are comparable among labor market areas.

Waynesburg labor market area has the most favorable industrial composition, producing average weekly earnings 22.4 per cent above the state average. At the other extreme, the composition of the Northeast Pennsylvania labor market area's industries is the most unfavorable, 6.1 per cent below the state average. As

Table 14 - Rate-Constant and Estimated Average Weekly Earnings per Worker for all Industries in Pennsylvania, by Labor Market Area, 1970

Labor Market Area (1)	Rate-Constant Average Weekly Earnings: Dollars (2)	Rate-Constant Average Weekly Earnings: Percentage of State Average (3)	Estimated Average Weekly Earnings: Dollars (4)	Estimated Average Weekly Earnings: Percentage of State Average (5)	Level of Industrial Earning Rate and Weekly Man-Hours Related to State Average (6)
1. Erie*	$ 125.3	102.8%	$ 119.3	96.4%	93.8%
2. Meadville	124.6	102.2	124.7	100.7	98.5
3. Oil City-Franklin	132.7	108.8	100.2	81.0	74.4
4. Warren	123.8	101.5	122.4	98.9	97.4
5. Sharon-Farrell	128.8	105.6	126.0	101.8	96.4
6. New Castle	125.9	103.2	117.1	94.6	91.7
7. Clarion	130.6	107.1	103.4	83.6	78.1
8. Butler	131.1	107.6	126.7	102.3	95.1
9. Kittanning-Ford City	128.9	105.7	109.5	88.5	83.7
10. Indiana	128.6	105.4	103.0	83.2	78.9
11. Pittsburgh*	125.3	102.8	132.1	106.7	103.8
12. Waynesburg	149.2	122.4	102.0	82.4	67.3
13. Uniontown-Connellsville	121.8	99.9	97.4	78.7	78.8
14. Johnstown*	126.9	104.1	110.8	89.5	86.0
15. Altoona*	121.2	99.4	107.6	86.9	87.4
16. Bedford	115.9	94.1	89.6	72.4	76.9
17. Huntingdon	119.3	97.8	94.7	76.5	78.2
18. Punxsutawney	122.5	100.5	98.1	79.3	78.9
19. Clearfield-Du Bois	125.3	102.7	94.1	76.0	74.0
20. St. Marys	127.7	104.7	121.4	98.1	93.7
21. Emporium	129.9	106.5	123.8	100.0	93.8
22. Bradford	125.8	103.2	110.3	89.1	86.3
23. Coudersport	125.7	103.1	81.6	65.9	63.9
24. Wellsboro	123.3	101.2	85.1	68.7	67.9
25. Sayre-Athens-Towanda	124.6	102.2	94.6	76.5	74.9
26. Dushore-Laporte	115.2	94.5	87.8	70.9	75.0
27. Tunkhannock	124.3	101.9	111.9	90.4	88.7
28. Susquehanna*	119.3	97.9	97.2	78.5	80.2
29. Bellefonte-State College	132.7	108.8	102.7	82.9	76.2
30. Lock Haven-Renovo	125.7	103.1	104.8	84.7	82.2
31. Williamsport*	121.8	99.9	110.7	89.4	89.5
32. Lewistown	124.7	102.3	100.0	80.7	78.9
33. Sunbury-Shamokin	119.1	97.7	102.2	82.6	84.5
34. Berwick-Bloomsburg	117.6	96.4	95.8	77.8	80.7
35. Pottsville	117.6	96.4	105.4	85.1	88.3

Table 14 - Rate-Constant and Estimated Average Weekly Earnings per Worker for all Industries in Pennsylvania, by Labor Market Area, 1970

Labor Market Area (1)	Rate-Constant Average Weekly Earnings: Dollars (2)	Rate-Constant Average Weekly Earnings: Percentage of State Average (3)	Estimated Average Weekly Earnings: Dollars (4)	Estimated Average Weekly Earnings: Percentage of State Average (5)	Level of Industrial Earning Rate and Weekly Man-Hours Related to State Average (6)
36. Northeast Pennsylvania*	$ 114.5	93.9	$ 100.9	81.5	86.8
37. Honesdale-Matamoras	116.2	95.3	97.2	78.5	82.4
38. Chambersburg-Waynesboro	119.7	98.2	109.3	88.3	89.9
39. Harrisburg*	122.8	99.3	124.0	100.1	100.8
40. Lebanon	119.2	97.7	105.8	85.5	87.5
41. York*	122.1	99.9	112.9	91.2	91.3
42. Lancaster*	119.5	98.0	108.1	87.3	89.1
43. Reading	121.4	99.6	113.7	91.9	92.3
44. Allentown-Bethlehem-Easton*	119.5	98.0	130.9	105.7	107.9
45. Philadelphia*	119.9	98.3	134.5	108.7	110.6
Pennsylvania	121.9	100.0	123.8	100.0	100.0

Column 2 - Computed by summing over all industries in a labor market area the product of the number of workers in a particular industry in the labor market area times the national average weekly earnings of the industry, and dividing the sum by the total number of workers for the labor market area. The rate-constant average for each area is a measure of the potential earning capacity of workers as determined by the mix of high and low-wage paying industries.
The computation was made for only 2-digit industries as shown in Table 11.

Column 3 - Column 2 expressed as a percentage of $121.9.

Column 4 - Actual annual wage and salary in a labor market area divided by total workers in the labor market area and divided by 52 weeks.

Column 5 - Column 4 expressed as a percentage of $123.8.

Column 6 - Column 5 divided by Column 3.

Source of Basic Data:
U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 16, No. 1, July 1970.
Pennsylvania Governor's Office of State Planning and Development, Pennsylvania Projection Series: Employment, Report No. 73, pps-2, November 1973 and Detailed Report on Income, Report No. 74, pps-3, November 1974.

shown in Table 14 there is no relation between urbanization level and industrial composition. Most of labor market areas with unfavorable industrial composition are located in the eastern part of the state. Among 13 metropolitan labor market areas only five of them, Erie, Pittsburgh, Johnstown, York and Harrisburg, have a favorable composition. yet none of these five areas are on the list of 9 ranking labor market areas with the most favorable composition. Except for Waynesburg the other eight most favorable labor market areas are Oil City-Franklin, Bellefonte-State College, Butler, Clarion, Emporium, Kittanning-Forest City, Sharon-Farrell and Indiana. Among eighteen labor market areas with unfavorable composition, however, twelve of them have an industrial composition three per cent or less below the state average. Except for Northeast Pennsylvania the other three most unfavorable market areas are Dushore-Laporte, Bedford and Honesdale-Matamoras.

The estimated average weekly earnings, as shown in column 4 of Table 14, represents the actual average weekly earnings for all labor market areas. The differences between the rate-constant and the estimated earnings reflect differences in earning rate and average weekly man-hours. Since the average weekly earnings for the nation included only nonsupervisory workers on private nonagricultural payrolls and the estimated weekly earnings included all workers, a comparison in terms of dollars between the two is improper. Contained in column 5 are the relative estimated earnings of labor market areas to the state average. Only 8 out of 45 labor market areas have actual average weekly earnings higher than the state average. Only four of these eight labor market areas are highly urbanized. Among lower-earning labor market areas fourteen of them have earnings 15 per cent or more below the state average.

Comparing column 3 and column 5 of Table 14, it can be seen that areas with favorable industrial composition are not necessarily the areas with high earnings. For example, the Waynesburg labor market area has the most favorable industrial composition, 22.4 per cent above the average and yet its actual earnings is 15.3 per cent below the state. The same situation occurred in the other 19 labor market areas. On the other hand, Philadelphia and Allentown-Bethlehem-Easton have both favorable industrial compositions as well as high earning rates. Therefore both industrial earning rate and annual average man-hours have a very significant effect on interregional income differentials.

When each labor market area's industrial composition is held at the state level, the difference in average weekly earnings resulting from differences in the combination of industrial earning rate and average weekly man-hours among labor market areas can be computed. As shown in column 6 of Table 14, which is the result of column 5 divided by column 3, there are only four labor market areas having favorable combinations of industrial earning rate and average weekly man-hours. They are Meadville, Pittsburgh, Allentown-Bethlehem-Easton and Philadelphia labor market areas. Coudersport is the most unfavorable labor market area at 26.1 per cent below the average. There is a tendency for the most unfavorable labor market areas to be rural areas where either weekly working hours are less or the industrial earning rate is low or both.

The manufacturing industry has been a key sector of Pennsyvania's economy. In 1970 the manufacturing industry accounted for 31.2 per cent of the state total employment and contributed 28.7 per cent of the state aggregate income or 36.3 per cent of the total labor income. For this reason, it is important to further examine the manufacturing industrial composition among labor market areas.

Contained in column 2 of Table 15 are the computed rate-constant average weekly earnings for manufacturing industris by labor market areas. It indicates that when the industrial earnings rate is held constant, the average weekly earnings in manufacturing among labor market areas ranged from $98.9 in Dushore-Laporte to $151.6 in the Oil City-Franklin-Titusville labor market area. In other words, the differences in manufacturing industrial composition can produce more than 30 percent of the differences in manufacturing wages and salaries among labor market areas. There are nineteen labor market areas with favorable manufacturing industrial composition. Most of these areas are located in the western part of the state. Comparing column 3 in both Tables 14 and 15, except for Philadelphia, those labor market areas which have favorable industrial composition for manufacturing also have favorable industrial composition for all industries. When all labor market areas are considered as a whole, the Pennsylvania industrial composition in manufacturing approximately equals the national level.

The lower average weekly earnings in manufacturing in Northeast Pennsylvania results from its concentration of apparel and textile industries which account for more than one-third of the area's manufacturing industrial employment.* Apparel and textile industries with its average earnings of $84.97 per week, lowers the rate-constant earnings of the Northeast Pennsylvania, increasing the unfavorableness of their position. The same condition holds in other areas with unfavorable industrial composition. For example, in the Altoona labor market area textile and apparel industries accounts for more than one quarter of the total area's manufacutring employment, and in Dushore-Laporte apparel and leather industries accounts for more than 80 percent of the manufacturing employment.

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*In Northeast Pennsylvania the first group of high-earning rate industries has accounted for less than 10 per cent of the total manufacturing industrial employment (Table 12)

Table 15 - Rate-Constant and Estimated Average Weekly Earnings per Worker for Manufacturing Industry, by Labor Market Area, 1970

Labor Market Area (1)	Rate-Constant Average Weekly Earnings: Dollars (2)	Rate-Constant Average Weekly Earnings: Percentage of State Average (3)	Estimated Average Weekly Earnings: Dollars (4)	Estimated Average Weekly Earnings: Percentage of State Average (5)	Level of Industrial Earning Rate and Weekly Man Hours Related to State Average (6)
1. Erie*	$ 140.2	105.5%	$ 154.8	105.5%	100.0
2. Meadville	136.5	102.7	143.9	98.1	95.5
3. Oil City-Franklin	151.6	114.1	160.3	109.3	95.8
4. Warren	139.6	105.0	154.8	105.5	100.5
5. Sharon-Farrell	145.8	109.7	173.3	118.2	107.7
6. New Castle	146.7	110.4	155.5	106.0	96.0
7. Clarion	135.3	101.8	130.1	88.7	87.1
8. Butler	150.1	112.9	166.5	113.5	100.5
9. Kittanning-Ford City	134.3	101.1	154.4	105.2	104.1
10. Indiana	126.2	95.0	118.4	80.7	85.0
11. Pittsburgh*	146.1	109.9	165.5	112.8	102.6
12. Waynesburg	111.9	84.2	91.4	62.3	74.0
13. Uniontown-Connellsville	130.2	98.0	115.8	78.9	80.5
14. Johnstown	133.0	100.1	137.0	93.4	93.3
15. Altoona*	123.9	93.2	120.1	81.9	87.9
16. Bedford	117.8	88.6	122.2	83.3	94.0
17. Huntingdon	115.7	87.1	102.5	69.9	80.3
18. Punxsutawney	127.7	96.1	109.4	74.6	77.6
19. Clearfield-Du Bois	120.3	90.5	123.4	84.1	92.9
20. St. Marys	136.7	102.9	134.8	91.9	89.3
21. Emporium	135.2	101.7	133.7	91.2	89.7
22. Bradford	135.6	102.0	135.1	92.1	90.3
23. Coudersport	125.6	94.5	100.0	68.1	72.1
24. Wellsboro	122.6	92.2	131.5	89.6	97.2
25. Sayre-Athens-Towanda	138.5	104.2	142.4	97.1	93.2
26. Dushore-Laporte	98.9	74.4	78.4	53.4	71.8
27. Tunkhannock	126.9	95.5	146.7	100.0	104.7
28. Susquehanna*	123.4	92.9	108.4	73.9	79.5
29. Bellefonte-State College	137.8	103.7	137.8	94.0	90.6
30. Lock Haven-Renovo	134.2	101.0	143.7	98.0	97.0
31. Williamsport*	125.1	94.1	128.0	87.2	92.7
32. Lewistown	136.3	102.6	129.3	88.1	85.9
33. Sunbury-Shamokin	117.1	88.1	115.6	78.8	89.4
34. Berwick-Bloomsburg	116.4	87.6	112.7	76.9	87.8
35. Pottsville	108.4	81.6	103.8	70.7	86.6

Table 15 - Rate-Constant and Estimated Average Weekly Earnings per Worker for Manufacturing Industry, by Labor Market Area, 1970

Labor Market Area (1)	Rate-Constant Average Weekly Earnings: Dollars (2)	Rate-Constant Average Weekly Earnings: Percentage of State Average (3)	Estimated Average Weekly Earnings: Dollars (4)	Estimated Average Weekly Earnings: Percentage of State Average (5)	Level of Industrial Earning Rate and Weekly Man Hours Related to State Average (6)
36. Northeast Pennsylvania*	$ 113.9	85.7	107.9	73.6	85.9
37. Honesdale-Matamoras	102.9	77.4	111.3	75.9	98.1
38. Chambersburg-Waynesboro	127.2	95.7	125.6	85.6	89.4
39. Harrisburg*	128.9	97.0	135.7	92.5	95.4
40. Lebanon	123.6	93.0	122.8	83.7	90.0
41. York*	128.0	96.3	132.7	90.5	94.0
42. Lancaster*	126.5	95.2	139.8	95.3	100.1
43. Reading	128.5	96.7	135.5	92.4	95.6
44. Allentown-Bethlehem-Easton*	125.8	94.7	133.9	91.3	96.4
45. Philadelphia	134.1	100.9	161.8	110.3	109.3
Pennsylvania	132.9	100.0	146.7	100.0	100.0
U. S. A.	131.8	99.2			

Column 2 - Computed by summing over all manufacturing industries in a labor market the product of the number of workers in a particular industry in the labor market area times the national average weekly earnings of the industry, and dividing the sum of the total number of manufacturing workers for the labor market area.

Column 3 - Column 2 expressed as a percentage of $132.9.

Column 4 - Annual manufacturing wages and salaries divided by total manufacturing employees and by 52 weeks.

Column 5 - Column 4 expressed as percentage of $146.7

Column 6 - Column 5 divided by Column 3.

SOURCE: U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 16, No. 1, July 1970. Pennsylvania Governor's Office of State Planning and Development, Pennsylvania Projection Series, Employment, Report No. 73, pps-2, November 1973 and Detailed Report on Income, Report No. 74, pps-3, November 1974.

Comparing columns 3 and 5 of Table 15, we find that labor market areas with favorable manufacturing industrial composition may not be the areas with high average weekly earnings, and those areas with high average weekly earnings do not necessarily have favorable industrial composition. The Tunkhannock labor market area, for example, has an unfavorable manufacturing industrial composition with 4.5 per cent below the state average. Yet its average weekly earnings is equal to the state average. Therefore, one area's average weekly earnings is not only a function of the area's industrial composition, but also a function of the industrial earning rate, weekly man-hours and other factors. It is interesting that labor market areas with low levels in manufacturing industrial earning rate and weekly man-hours are concentrated in two zones across the state from northeast to southwest. Most of the labor market areas within these two zones are areas experiencing declines in mining, agriculture or other industries. Low wage industries or labor intensive industries, such as the apparel, textile, leather and related industries have, therefore, been attracted into these areas because of an increase in the number of unemployed low-skilled workers.

The effect of the industrial earning rate and man-hours on earnings may be interpreted by Table 16. The table shows that among eleven metropolitan labor market areas Pittsburgh has the most favorable manufacturing industrial composition with 10.6 per cent above the national average, while Altoona has the most unfavorable composition with 18.1 per cent below the national average. In other words, with all other factors being constant, industrial composition alone could create a difference in average weekly earnings among Pennsylvania metropolitan areas as large as $30 per worker. Comparing each metropolitan area and national rate-constant average, we can see that Erie, Pittsburgh, Johnstown and Philadelphia have a better manufacturing industrial composition than that of the nation. As shown in column 4 of Table 16 the reported average hourly earnings among metropolitan areas in Pennsylvania ranges from $2.82 to $3.74. Column 5 of the same table indicates that

Table 16 - Reported Average Weekly Earnings, Average Hourly Earnings and Average Weekly Hours for Manufacturing Industry, by Metropolitan Labor Market Area, 1970

Metropolitan Labor Market Area	Rate-Constant Average Weekly Earnings		Reported Average Hourly Earnings		Reported Average Weekly Hours		Reported Average Weekly Earnings	
	Dollars	Percentage of National Average	Dollars per Hour	Percentage of National Average	Hours	Percentage of National Average	Dollars	Percentage of National Average
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Erie	$ 140.2	106.4%	$ 3.39	102.1%	41.1	103.5	$ 139.3	105.7%
Pittsburgh	146.1	110.6	3.74	112.7	40.7	102.5	152.2	115.5
Johnstown	133.0	100.9	3.43	103.3	36.7	92.4	125.9	95.5
Altoona	108.0	81.9	2.82	84.9	38.1	96.0	107.4	81.5
Northeast Pennsylvania	113.9	86.4	2.74	82.5	36.5	91.3	99.2	75.3
Harrisburg	128.9	97.8	3.06	92.2	40.3	101.5	123.3	93.6
York	128.0	97.1	2.96	89.2	40.7	102.5	120.5	91.2
Lancaster	126.5	96.0	3.04	91.6	40.1	101.0	121.9	92.5
Reading	128.5	97.5	3.10	93.4	39.9	100.5	127.7	96.9
Allentown-Bethlehem-Easton	125.8	95.5	3.29	99.1	38.7	97.5	120.1	91.1
Philadelphia	134.1	101.7	3.48	104.8	39.7	100.1	138.2	104.9
Pennsylvania	132.9	100.8	3.31	99.7	39.4	99.2	130.4	98.9
U.S.A.	131.8	100.0	3.32	100.0	39.7	100.0	131.8	100.0

Source: U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Volume 16, No. 1, July 1970. Pennsylvania Department of Labor and Industry, Bureau of Employment Security, Pennsylvania Employment and Earnings, Volume 15, No. 5, May 1970.

those areas having favorable manufacturing industrial composition also have higher average hourly earnings. However, it should be borne in mind that averages of hourly earnings differ from wage rates; that is, if average hourly earnings in area A are higher than that in area B it is not necessary that the wage rate in area A is higher than that in area B. For example, if there are two industries X and Y, assume that hourly wage rate for industries X and Y in area A are $3.05 and $2.05 and in area B,$3.00 and $2.00 and that weekly hours for industries X and Y in area A are 36 and 42, and in area B, 42 and 36 hours respectively. We will find that average hourly earnings for both industries in area A is $2.51 and in area B is $2.54, although hourly wage rates of both industries X and Y in area A are respectively higher than that in area B. It is significant that average hourly earnings is affected by industrial composition and also by the distribution of weekly hours among industries.

If we disregard the amount of reported average hourly earnings and industrial composition at this moment and look at columns 5 and 7 of Table 16, we can see that Pittsburgh's average hourly earnings is 12.7 per cent above the national average, while Northeast Pennsylvania is 17.5 per cent below the national average. The difference of weekly hours among metropolitan areas is considerably small. Erie's average weekly hours are 3.5 per cent above that of the nation, on the other hand, Northeast Pennsylvania's are 0.7 per cent below the national average. Seven out of eleven metropolitan labor market areas have average weekly hours above the national average. Average hourly earnings and average weekly hours in Erie, Pittsburgh and Philadelphia areas are relatively higher than the national average, therefore, we can expect average weekly earnings in these three areas will be higher than that of the nation . As shown in column 9 of Table 16 Pittsburgh's average weekly earnings are 15.5 per cent, Erie's 5.7 per cent and Philadelphia's 4.9 per cent above the national average. Johnstown's average hourly earnings are 3.3 per cent higher than that of the nation, but its average weekly hours are 7.6 per cent below the national average; therefore its

average weekly earnings are 4.5 per cent below the national average. There are four metropolitan labor market areas, Harrisburg, York, Lancaster and Reading with average weekly hours above the nation, and yet because their average hourly earnings are relatively low their average weekly earnings are below the nation's. In three other metropolitan areas, Altoona, Northeast Pennsylvania and Allentown-Bethlehem-Easton, both average hourly earnings and average weekly hours are below the national averages, therefore the gap of average weekly earnings between the three labor market areas and the nation are widely split, e.g., Northeast Pennsylvania accounted for only three quarters of the national average, Altoona, four-fifths and Allentown-Bethlehem-Easton accounted for 90 per cent of the national average. When we consider the state as a whole Pennsylvania's average hourly earnings and average weekly hours are very close to the nation, and the state average weekly earnings about one per cent below the national average.

V. Occupational Earnings

The variation in regional per capita incomes also can be explained by [illegible] earnings occupational sturcture of labor market areas. The occupational classification is presumed to reflect the basic levels of skill used by each person in the experienced labor force in order to obtain a wage and salary income.

Both the wage and salary earnings for different occupations and the numbers in each occupation vary from labor market area to labor market area. A labor market area with a relatively larger proportion of its labor force attached to the lower paying occupations might be expected to have a lower average annual wage and salary earning than a labor market area with a relatively smaller proportion in these categories. As shown in Table 17 the percentage distribution of occupations in labor market areas has considerable dispersion. The shares of occupations in the professional and managerial category ranged from 12.3 percent in Pottsville to 30.9 percent in Bellefonte-State College, and in the clerical and sales category ranged from 14.2 per cent in Dushore-Laporte to 28.4 per cent in Philadelphia. There is a tendency for the concentration of workers in these two categories to conform to the level of urbanization. In 1970 Pittsburgh, Harrisburg and Philadelphia were the labor market areas with percentages in these two categories higher than that of the state average. The heavy concentration of professional and managerial workers in Bellefonte-State College is due to the location of the Pennsylvania State University within the area; the university provides many academic positions which fall in this category. On the other hand, rural areas have a larger proportion of workers classified as unskilled manual labor force. The distribution of skilled manual labor among labor market areas has less dispersion.

Table 17 - Percentage Distribution of Occupation in Pennsylvania, by Skill and by Labor Market Area, 1970

Labor Market Area	Total	Professional and Managerial	Clerical and Sales	Skilled Manual	Unskilled Manual
1. Erie*	100.0%	20.4%	23.8%	38.6%	17.2%
2. Meadville	100.0	18.5	18.4	43.3	19.8
3. Oil City-Franklin	100.0	18.0	20.7	39.4	21.9
4. Warren	100.0	19.9	20.9	38.4	20.8
5. Sharon-Farrell	100.0	19.1	19.9	40.7	20.3
6. New Castle	100.0	17.0	21.5	42.3	19.2
7. Clarion	100.0	17.4	18.5	43.4	20.7
8. Butler	100.0	19.4	19.8	39.2	21.6
9. Kittanning-Ford City	100.0	15.4	17.2	42.8	24.6
10. Indiana	100.0	18.8	19.6	38.2	23.5
11. Pittsburgh*	100.0	23.0	26.1	28.2	22.7
12. Waynesburg	100.0	17.2	15.5	45.7	21.6
13. Uniontown-Co-nellsville	100.0	16.1	17.8	45.3	20.8
14. Johnstown*	100.0	16.6	19.6	42.0	21.8
15. Altoona*	100.0	17.0	21.4	42.5	19.1
16. Bedford	100.0	13.7	16.1	44.4	25.8
17. Huntingdon	100.0	15.5	14.9	45.9	23.7
18. Punxsutawney	100.0	15.3	16.8	46.7	21.2
19. Clearfield-DuBois	100.0	16.5	18.7	45.2	19.6
20. St. Marys	100.0	17.7	17.3	46.0	19.0
21. Emporium	100.0	20.5	14.0	49.9	15.6
22. Bradford	100.0	19.0	19.9	40.8	20.3
23. Coudersport	100.0	16.6	15.2	43.2	25.0
24. Wellsboro	100.0	17.8	17.0	40.0	25.2
25. Sayre-Athens-Towanda	100.0	18.7	16.7	41.1	23.5
26. Dushore-Laporte	100.0	16.7	14.2	44.7	24.4
27. Tunkhannock	100.0	18.3	17.7	41.9	22.1
28. Susquehanna*	100.0	15.8	16.8	43.5	23.9
29. Bellefonte-State College	100.0	30.9	22.4	22.2	24.5
30. Lock Haven-Renovo	100.0	19.4	19.0	42.4	19.2
31. Williamsport*	100.0	18.1	22.1	41.5	18.3
32. Lewistown	100.0	14.4	16.0	47.9	21.7
33. Sunbury-Shamokin	100.0	15.2	17.4	45.6	21.8
34. Berwick-Bloomsburg	100.0	16.1	17.2	47.8	18.9
35. Pottsville	100.0	12.3	15.8	56.1	15.8
36. Northeast Pennsylvania*	100.0	17.1	21.0	45.8	16.1
37. Honesdale-Matamoras	100.0	17.8	16.9	40.4	24.9
38. Chambersburg-Waynesboro	100.0	17.4	18.6	42.3	21.7
39. Harrisburg*	100.0	22.8	28.9	29.9	18.4
40. Lebanon	100.0	14.2	18.4	47.1	20.3
41. York*	100.0	17.6	21.1	43.9	17.4
42. Lancaster*	100.0	17.9	20.0	41.0	21.1
43. Reading*	100.0	16.8	21.2	45.0	17.0
44. Allentown-Bethlehem-Easton*	100.0	18.5	21.1	44.0	16.4
45. Philadelphia*	100.0	23.3	28.4	31.6	16.7
Pennsylvania	100.0	20.8	24.3	36.7	18.2

Source of Basic Data: U. S. Bureau of the Census, General Social and Economic Characteristics, Pennsylvania, 1970.

It seems that skilled manual labor is distributed correspondingly to the size of population.

The effects of compositional differences in occupation may be appraised by computing for each market area an average earnings that reflects only differences in occupational composition. The average earnings may be computed by weighting the national average annual earnings of an occupation by the number in the experienced labor force (attached to the occupation) in the labor market area, and summing the results for all occupations to obtain an average earning figure for the labor market area. Since the same national occupational earnings are used for each labor market area, these computed figures are called rate-constant average annual earnings.

Because of the limitation in data, column 2 of Table 18 was computed by using the 1969 U. S. annual median occupational earnings in lieu of average annual occupational earnings. In the computation occupations in a labor market area have been classified into twelve major categories. Because the data were not detail enough the variation of estimated occupational earnings among labor market areas has been found to be relatively small. However, from these figures some notion of how much the labor market occupational compositions vary from the state composition still can be expressed. It should be noted that figures in Table 18 cannot be used to compare with those in Table 14 because earnings of Table 14 account for only non-supervisory workers on private non-agricultural payrolls, while earnings of Table 18 account for all industrial sectors and for all wage and salary workers.

In column 2 of Table 18 the rate-constant earnings represent the occupational composition of a labor market area weighted by average occupational earnings. In column 3 the difference for the labor market area from the state average occupational composition is expressed as a percentage of the state average. Thus, it can be said that Johnstown's occupational composition is 1.9 per cent less remunerative than that of the state as a whole. Since it is less

Table 18 - Rate-Constant Average Annual Occupational Earnings for Total Wage and Salary Workers in Pennsylvania, by Labor Market Area, 1969

Labor Market Area (1)	Rate-Constant Average Annual Earnings: Dollars (2)	Rate-Constant Average Annual Earnings: Percentage of State Average (3)
1. Erie*	$ 6,416	100.7%
2. Meadville	6,358	99.8
3. Oil City-Franklin	6,281	98.4
4. Warren	6,310	99.1
5. Sharon-Farrell	6,342	99.6
6. New Castle	6,335	99.5
7. Clarion	6,295	98.8
8. Butler	6,357	99.8
9. Kittanning-Ford City	6,165	96.8
10. Indiana	6,232	97.9
11. Pittsburgh*	6,462	101.5
12. Waynesburg	6,359	99.8
13. Uniontown-Connellsville	6,296	98.9
14. Johnstown*	6,247	98.1
15. Altoona*	6,301	98.9
16. Bedford	6,108	95.9
17. Huntingdon	6,112	96.0
18. Punxsutawney	6,251	98.3
19. Clearfield-Du Bois	6,295	98.8
20. St. Marys	6,336	99.5
21. Emporium	6,486	101.8
22. Bradford	6,304	99.0
23. Coudersport	6,173	96.9
24. Wellsboro	6,223	97.7
25. Sayre-Athens-Towanda	6,277	98.5
26. Dushore-Laporte	6,240	98.0
27. Tunkhannock	6,288	98.7
28. Susquehanna*	6,177	97.0
29. Bellefonte-State College	6,434	101.0
30. Lock Haven-Renovo	6,317	99.2
31. Williamsport*	6,295	98.8
32. Lewistown	6,203	97.4
33. Sunbury-Shamokin	6,157	96.7
34. Berwick-Bloomsburg	6,243	98.0
35. Pottsville	6,183	97.1
36. Northeast Pennsylvania*	6,293	98.8
37. Honesdale-Matamoras	6,269	98.4
38. Chambersburg-Waynesboro	6,226	97.8
39. Harrisburg*	6,395	100.4
40. Lebanon	6,136	96.4
41. York*	6,330	99.3
42. Lancaster*	6,251	98.2
43. Reading*	6,274	98.5
44. Allentown-Bethlehem-Easton*	6,337	99.5
45. Philadelphia*	6,417	100.7
Pennsylvania	6,369	100.0
United States	6,401	100.5

Note: Column 2 is computed by using following equation

$$E^j = \frac{\sum_{i=1}^{n} L_i^j E_i^n}{\sum_{i=1}^{n} L_i^j}$$

Where: E^j - Rate Constant Earnings in labor market are;
E_i^n - National average earnings of occupation i
L_i^j - Workers of occupation i in labor market area j

Source of Basic Data: Bureau of the Census, General Social and Economic Characteristics, 1970

Column 2: The rate constant average for each area is a measure of potential earning capacity of workers as determined by the mix of high and low-wage paying occupational skill categories.

remunerative, it can be said that Johnstown has an unfavorable occupational composition. The interregional range is from Bedford unfavorable to Emporium favorable in occupational composition with 4.1 per cent below and 1.8 per cent above the state average respectively. There are only six labor market areas with favorable occupational compositions and four of them are metropolitan areas: Erie, Pittsburgh, Harrisburg and Philadelphia. The most unfavorable occupational composition is found in Bedford where occupations in unskilled manual labor force account for a large proportion of workers. Earnings in these occupations are below the group average and contribute substantially to the unfavorable composition of the operative group in the Bedfor labor market area.

VI. Other Socio-economic Factors

So far, we have analyzed regional occupational and industrial differentials which account for a large proportion of interregional income inequality. There are many other socio-economic factors, such as labor participation rate, unemployment, migration flow, commuting pattern and public assistance, which affect to some extent the level of inequality. These factors also may reflect some of differentials found in the study of regional occupational and industrial differentials.

Labor Participation Rate

The labor participation rate is computed as the percentage of employed and unemployed persons for all civilians 16 years and over. It indicates what per cent of the labor force is productive in the period of observation. An area with a high labor participation rate has a tendency toward higher personal income. Other things equal, a higher labor participation rate implies higher personal income per capita and an increase in labor participation will increase personal income per capita. As shown in Table 19 the labor participation rate in Pennsylvania ranged from 63.3 percent to 82.3 percent for males and from 25.2 percent to 48.2 percent for females. From the table it can be seen that areas with a high labor force participation rate are geographically concentrated in the eastern part of the state. Among eleven labor market areas with high labor participation rates for both male and female, eight are located in southeast Pennsylvania. As we recall from Table 14 this is contrary to the findings that most labor market areas with favorable industrial composition are located in the western part of the state. Generally speaking, it seems that the eastern part of the state provides more low-wage job opportunities for attracting more female workers. The high female labor participation rate results in high personal income per capita in the eastern part of the state.

Table 19 - Labor Force Participation Rate in Pennsylvania by Sex and by Labor Market Area, 1970

Labor Market Area	Participation Rate	
	Male	Female
1. Erie*	78.0%	39.0%
2. Meadville	75.7	36.9
3. Oil City-Franklin	68.0	31.0
4. Warren	72.2	37.2
5. Sharon-Farrell	75.0	33.1
6. New Castle	74.5	32.2
7. Clarion	68.5	31.1
8. Butler	75.3	32.3
9. Kittanning-Ford City	71.9	27.7
10. Indiana	68.8	32.7
11. Pittsburgh*	75.0	34.0
12. Waynesburg	64.0	25.2
13. Uniontown-Connellsville	66.5	26.5
14. Johnstown*	69.2	32.2
15. Altoona*	72.6	37.0
16. Bedford	76.1	35.2
17. Huntingdon	66.0	36.8
18. Punxsutawney	72.3	34.6
19. Clearfield-Du Bois	72.4	35.1
20. St. Marys	77.7	42.5
21. Emporium	80.1	46.4
22. Bradford	75.4	41.1
23. Coudersport	73.3	34.6
24. Wellsboro	73.1	33.0
25. Sayre-Athens-Towanda	77.6	36.8
26. Sushore-Laporte	73.7	31.8
27. Tunkhannock	76.7	37.8
28. Susquehanna*	77.8	37.3
29. Bellefonte-State College	63.3	42.5
30. Lock Haven-Renovo	75.0	37.1
31. Williamsport*	76.4	40.5
32. Lewistown	78.4	37.8
33. Sunbury-Shamokin	69.6	40.0
34. Berwick-Bloomsburg	74.0	43.4
35. Pottsville	71.5	39.4
36. Northeast Pennsylvania*	74.5	41.4
37. Honesdale-Matamoras	67.3	36.5
38. Chambersburg-Waynesboro	78.8	41.3
39. Harrisburg*	78.5	44.6
40. Lebanon	80.0	48.2
41. York*	81.0	44.8
42. Lancaster*	82.3	45.9
43. Reading*	79.8	46.1
44. Allentown-Bethlehem-Easton*	77.8	43.8
45. Philadelphia*	77.4	42.2
Pennsylvania	75.8	39.3

Source: Governor's Office of State Planning and Development, Pennsylvania, The Population of Pennsylvania, A Profile for 1970, September 1973.

Dependency Ratio

The age composition has equally striking effects upon the level of per capita personal income. These effects can be expressed by a dependency ratio. When a population is divided into three age-groups: children (age 0-17 years old), adults (age 18-64 years old) and old people (age 65 years old and over), the dependency ratio can be derived by comparing non-productive groups of children and old people to the productive group of adults.

The proportion of adult population does not vary greatly from area to area. The main regional differences are in the proportions of children and old people. Dependency ratios for children vary from 44.1 percent to 71.2 percent, while for old people from 9.8 percent to 28.7 percent. When the dependency for both children and old people are combined as a whole, the dependency ratio varies from 53.9 percent to 95.2 percent (Table 20). It should be pointed out that in the Bellefonte-State College labor market area the proportion of adult population tends to be high because the area's population has been bolstered with a great number of college students from the Pennsylvania State University. Therefore, the area's dependency ratio tends to be low. In general there is a tendency for the dependency ratio in industrialized areas to be lower than that in rural areas.

Unemployment Rate

The level of unemployment and the level of per capita personal income have an inverse relationship, i.e., an increase in the unemployment rate tends to reduce personal income. The unemployment rate varies not only from area to area but also from occupation to occupation. Concerning occupations the unemployment rate tends to be high in the unskilled manual and skilled manual categories and

Table 20 - Dependency Ratio in Pennsylvania by Labor Market Area, 1970

Labor Market Area	Dependency Ratio		
	Total	Children	Aged
1. Erie*	81.9%	64.7%	17.2%
2. Meadville	82.4	61.5	20.9
3. Oil City-Franklin	82.4	61.7	20.7
4. Warren	82.9	61.4	21.5
5. Sharon-Farrell	80.4	61.4	19.0
6. New Castle	78.0	58.6	19.4
7. Clarion	79.7	59.2	20.5
8. Butler	82.2	64.8	17.4
9. Kittanning-Ford City	81.8	60.4	21.4
10. Indiana	73.1	55.2	17.9
11. Pittsburgh*	75.2	56.6	18.6
12. Waynesburg	84.1	59.5	24.6
13. Uniontown-Connellsville	84.4	61.6	22.8
14. Johnstown*	81.3	61.1	20.2
15. Altoona*	82.6	59.0	23.6
16. Bedford	86.7	66.0	20.7
17. Huntingdon	78.0	58.9	19.1
18. Punxsutawney	87.4	61.2	26.2
19. Clearfield-Du Bois	87.4	64.7	23.0
20. St. Marys	89.1	71.2	17.9
21. Emporium	82.0	64.5	17.5
22. Bradford	87.9	64.4	23.5
23. Coudersport	95.2	70.2	25.0
24. Wellsboro	83.0	63.8	19.2
25. Sayre-Athens-Towanda	94.8	73.8	21.0
26. Dushore-Laporte	93.0	67.1	25.9
27. Tunkhannock	87.5	66.5	21.0
28. Susquehanna*	89.8	68.3	21.5
29. Bellefonte-State College	53.9	44.1	9.8
30. Lock Haven-Renovo	74.0	56.1	17.9
31. Williamsport*	82.3	61.3	21.0
32. Lewistown	82.2	63.3	18.9
33. Sunbury-Shamokin	74.8	53.8	21.0
34. Berwick-Bloomsburg	73.9	53.7	20.2
35. Pottsville	74.1	51.2	22.9
36. Northeast Pennsylvania*	72.7	50.2	22.5
37. Honesdale-Matamoras	88.6	59.9	28.7
38. Chambersburg-Waynesboro	80.5	61.7	18.8
39. Harrisburg*	74.2	56.4	17.8
40. Lebanon	77.5	58.9	18.6
41. York*	79.5	60.8	18.7
42. Lancaster*	80.9	62.2	18.7
43. Reading*	73.3	52.6	20.7
44. Allentown-Bethlehem-Easton*	72.3	53.3	19.0
45. Philadelphia*	76.2	58.2	18.0
Pennsylvania	76.7	57.6	19.1

Note: Dependency Ratio = $\frac{\text{Children (Under 18 years old) + Old People (65 years old and over}}{\text{Adults (18-64 years old)}}$

Source of Basic Data: The U. S. Bureau of the Census, General Population Characteristics, Pennsylvania, 1970.

to be low in the clerical and sales and the professiona and managerial categories. In 1970 the state average unemployment rates for these four occupational groups were 4.8 percent, 4.2 percent, 2.6 percent and 1.4 percent respectively (Table 21).

Because the unemployment rate in manual skills was relatively high, and the labor force classified as manual occupied a relatively large proportion of employment in rural areas we therefore can expect that unemployment rate in rural areas tends to be high. As shown in Table 21, areas with low unemployment rate are concentrated in the southeast and the northwest of the state. In these areas the level of industrialization and per capita personal income are relatively high.

Public Assistance Income

Another factor which directly affects the level of personal income is public assistance income. This income includes cash receipts of payments made under the public assistance programs of aid to families with dependent children, old age assistance, general assistance, aid to the blind and aid to the permanently and totally disabled. Eligibility for public assistance income is restricted to families with incomes less than poverty level.*

In 1969 families with incomes less than poverty level accounted for 7.9 percent of all families in Pennsylvania. This percentage ranged statewide from 5 percent to 17.8 percent. The dispersion of low-income families can be explained by Table 22. As shown in the table there are more low-income families in rural and mining areas. However, the table indicates that the percent of families with incomes less than poverty level receiving public assistance income tends to be

* For the definition of poverty, see U.S. Bureau of the Census, Current Population Reports, Series p-23, No. 28, Revision in Poverty Statistics, 1959 to 1968.

Table 21 - Number and Rate of Unemployment in Pennsylvania, by Occupation and by Labor Market Area, 1970

Labor Market Area	Total**		Professional and Managerial		Clerical and Sales		Skilled Manual		Unskilled Manual	
	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate
1. Erie*	3,802	3.7%	311	1.5%	676	2.8%	1,852	4.6%	882	4.9%
2. Meadville	1,049	3.3	49	.9	117	2.0	529	3.9	332	5.2
3. Oil City-Franklin	688	3.0	41	1.0	121	2.6	250	2.8	262	5.1
4. Warren	552	3.1	48	1.2	61	1.6	260	3.7	167	4.4
5. Sharon-Farrell	1,640	3.5	112	1.3	306	3.3	702	3.7	463	4.8
6. New Castle	1,774	4.5	69	1.1	310	3.7	828	4.9	515	6.6
7. Clarion	544	4.1	5	.2	46	1.9	285	4.9	199	7.1
8. Butler	1,622	3.5	97	1.1	220	2.5	710	3.9	518	5.2
9. Kittanning-Ford City	1,608	6.2	56	1.5	152	3.5	860	7.7	503	7.8
10. Indiana	1,161	4.1	25	.5	127	2.4	579	5.3	407	6.0
11. Pittsburgh*	35,291	3.9	2,801	1.4	7,245	3.1	13,073	5.0	10,437	5.0
12. Waynesburg	652	5.8	51	2.7	65	3.8	302	5.9	219	8.8
13. Uniontown-Connellsville	2,978	6.1	100	1.3	346	4.0	1,526	6.8	910	8.7
14. Johnstown*	4,225	4.6	215	1.5	534	3.0	2,122	5.5	1,185	5.8
15. Altoona*	1,652	3.2	132	1.5	216	2.0	836	3.8	377	3.8
16. Bedford	970	6.2	32	1.5	59	2.4	507	7.2	364	8.7
17. Huntingdon	870	6.2	36	1.7	88	4.3	509	7.7	231	6.9
18. Punxsutawney	675	4.2	12	.5	58	2.2	407	5.3	180	5.2
19. Clearfield-Du Bois	1,711	6.3	74	1.7	149	3.0	1,062	8.4	413	7.6
20. St. Marys	752	5.2	38	1.5	78	3.2	375	5.5	238	8.3
21. Emporium	131	4.3	11	1.8	16	3.8	86	5.6	18	3.8
22. Bradford	1,007	4.9	57	1.5	134	3.3	563	6.6	236	5.6
23. Coudersport	327	5.5	24	2.5	38	4.3	183	7.0	82	5.5
24. Wellsboro	664	4.7	14	.6	63	2.7	396	6.9	187	5.2
25. Sayre-Athens-Towanda	801	3.7	30	.8	60	1.7	526	5.9	166	3.3
26. Dushore-Laporte	56	2.7	9	2.6	10	3.3	17	1.8	14	2.7
27. Tunkhannock	418	5.7	21	1.6	36	2.8	263	8.3	98	6.0
28. Susquehanna*	558	4.2	32	1.6	49	2.3	295	5.1	171	5.4
29. Bellefonte-State College	1,364	3.5	221	1.9	225	2.6	464	5.2	449	4.6
30. Lock Haven-Renovo	1,100	7.4	45	1.7	74	2.8	762	11.6	209	7.4
31. Williamsport*	1,866	4.1	105	1.3	217	2.2	1,043	5.5	444	5.3
32. Lewistown	581	2.4	36	1.1	84	2.2	461	3.9	229	4.3
33. Sunbury-Shamokin	2,148	3.2	125	1.2	179	1.5	1,277	4.1	528	3.6
34. Berwick-Bloomsburg	687	3.0	28	.8	89	2.2	445	4.0	125	2.9
35. Pottsville	2,375	3.7	52	.7	236	2.4	1,482	4.1	558	5.4

Table 21 - Number and Rate of Unemployment in Pennsylvania, by Occupation and by Labor Market Area, 1970

Labor Market Area	Total*		Professional and Managerial		Clerical and Sales		Skilled Manual		Unskilled Manual	
	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate	Unemployed Persons	Unemployment Rate
36. Northeast Pennsylvania*	10,682	4.2	682	1.6	1,243	2.4	6,377	5.4	2,079	5.0
37. Honesdale-Matamoras	535	3.5	15	.6	51	2.0	314	5.0	155	4.0
38. Chambersburg-Waynesboro	1,536	3.4	59	.8	185	2.2	830	4.3	439	4.4
39. Harrisburg*	3,617	2.1	315	.8	802	1.6	1,462	2.8	798	2.5
40. Lebanon	751	1.7	54	.9	80	1.0	431	2.1	162	1.8
41. York*	3,126	2.2	282	1.1	537	1.8	1,504	2.4	756	3.0
42. Lancaster*	2,818	2.0	104	.4	461	1.7	1,359	2.4	747	2.5
43. Reading*	3,084	2.3	190	.9	408	1.5	1,789	3.0	591	2.6
44. Allentown-Bethlehem-Easton*	4,663	2.1	311	.8	782	1.7	2,196	2.2	1,181	3.2
45. Philadelphia*	53,391	3.4	5,723	1.6	12,267	2.7	21,408	4.2	12,261	4.6
Pennsylvania	162,714	3.5	12,929	1.4	29,300	2.6	73,147	4.2	41,582	4.8

** Includes persons who last worked more than 10 years ago, not shown separately.

Source of Basic Data: The U. S. Department of Commerce, Bureau of the Census, General Social and Economic Characteristics, Pennsylvania, 1970.

Table 22 - Families with Income Less than Poverty Level and Percent Receiving Public Assistance Income in Pennsylvania, by Labor Market Area, 1969

Labor Market Area	Families with Income Less than Poverty Level		Percent of All Families Receiving Public Assistance Income
	Percent of All Families	Percent Receiving Public Assistance Income	
1. Erie*	6.8%	20.9%	1.4%
2. Meadville	10.2	15.7	1.6
3. Oil City-Franklin	10.4	19.5	2.0
4. Warren	6.9	10.5	.7
5. Sharon-Farrell	7.6	19.1	1.4
6. New Castle	9.4	23.2	2.1
7. Clarion	13.8	13.7	1.8
8. Butler	8.6	11.3	.9
9. Kittanning-Ford City	11.0	17.9	1.9
10. Indiana	11.7	18.5	2.1
11. Pittsburgh*	7.2	26.6	1.9
12. Waynesburg	17.8	22.6	4.0
13. Uniontown-Connellsville	16.7	31.7	5.2
14. Johnstown*	9.7	23.5	2.3
15. Altoona*	8.4	17.5	1.5
16. Bedford	12.4	10.1	1.3
17. Huntingdon	12.8	21.4	2.7
18. Punxsutawney	11.7	18.9	2.2
19. Clearfield-Du Bois	13.8	13.6	1.9
20. St. Marys	7.4	5.0	.4
21. Emporium	6.3	24.6	1.6
22. Bradford	9.0	25.0	2.3
23. Coudersport	13.3	18.7	2.5
24. Wellsboro	12.5	18.4	2.3
25. Sayre-Athens-Towanda	10.5	21.4	2.2
26. Dushore-Laporte	15.5	4.7	.7
27. Tunkhannock	11.4	9.3	1.1
28. Susquehanna*	12.5	14.5	1.8
29. Bellefonte-State College	9.1	9.1	.8
30. Lock Haven-Renovo	8.8	18.2	1.6
31. Williamsport*	8.1	18.4	1.5
32. Lewistown	9.8	13.5	1.3
33. Sunbury-Shamokin	9.9	14.4	1.4
34. Berwick-Bloomsburg	8.0	9.1	.7
35. Pottsville	10.9	12.6	1.4
36. Northeast Pennsylvania*	8.4	15.7	1.3
37. Honesdale-Matamoras	10.2	3.8	.4
38. Chambersburg-Waynesboro	8.7	9.0	.8
39. Harrisburg*	6.6	20.1	1.3
40. Lebanon	4.6	18.1	.8
41. York*	5.6	14.1	.8
42. Lancaster*	6.5	14.1	.9
43. Reading*	5.0	18.8	.9
44. Allentown-Bethlehem-Easton*	5.4	15.3	.8
45. Philadelphia*	7.6	29.1	2.2
Pennsylvania	7.9	22.8	1.8

Source of Basic Data: The U. S. Bureau of the Census, General Social and Economic Characteristics, 1970.

higher in urbanized and mining-oriented labor market areas. For example, in 1969 Philadelphia had a rate of 29.1 percent, Pittsburgh 26.6 percent, and Uniontown-Connellville 31.7 percent, while the state rate was 22.8 percent. The reason that more families with incomes less than poverty level tend to claim for public assistance income in highly urbanized areas may be attributed to two different factors. First the high living cost in urban areas forces a greater number of families to rely on public assistance for maintaining their minimum living needs. Second, a great portion of families under the poverty level in center cities are Negro families and about half of these Negro families filed for public assistance income in 1969. On the other hand, the income of families in poverty in mining areas was realtively low. For example, families with incomes less than $2,000 accounted for 8.1 percent of all families in Uniontown-Connellville and for 10.7 percent in Waynesburg, while accounting for only 4.3 percent at the state level. Therefore, many low-income families in mining areas are forced to depend on public assistance programs for maintaining their minimum living needs. As shown in Table 22 four percent of all families in Waynesburg and 5.2 percent of all families in Uniontown-Connellville received public assistance income in 1969, while during the same period families receiving public assistance only accounted for 1.8 percent of all families in Pennsylvania.

Migration

It is generally the case that population movement corresponds to economic development. Regions with an expanding economy will attract net immigration from other parts of the country. On the other hand, stagnant regions lose population. During the 1960-1970 period eleven labor market areas in Pennsylvania experienced net immigration. Yet the state totally lost 366,710 people during the same period. (Table 23) It indicates that economic growth in most of labor market areas in Pennsylvania has lagged behind the national growth. These highly stagnant labor market areas are located in the western part of the state and, except for Philadelphia, areas with net out-migration are within Pennsylvania Appalachia Region.

In this study we are mostly concerned with the question: does migration tend to widen or narrow regional income inequality? Data on migration by age are not available for labor market areas, but available for state economic areas. (Figure 4) Therefore, whether migration favors growing areas or disfavors stagnant regions can not be observed in detail by labor market area. However, many state economic areas as defined by the U.S. Bureau of the Census consist of labor market areas. Table 24 affords a picture about the impact of migration on regional economy.

In 1957 G. Myrdal wrote "as migration is always selective, at least with respect to the migrant's age, this movement by itself tends to favor the rapidly growing communities and disfavor the others."* During the 1965-1970 period 48.9 percent of the people who left Pennsylvania were in the most productive age group, ranged from 20 to 39 years old, while Pennsylvania's inmigrants accounted for 47.5 percent for the same age group. Therefore, migration tends to decrease the proportion of the population in the labor force of Pennsylvania and to debilitate

*Myrdal, op. cit., p. 27.

Figure 4
STATE ECONOMIC AREAS, PENNSYLVANIA, 1970
(as defined by the U.S. Bureau of the Census)

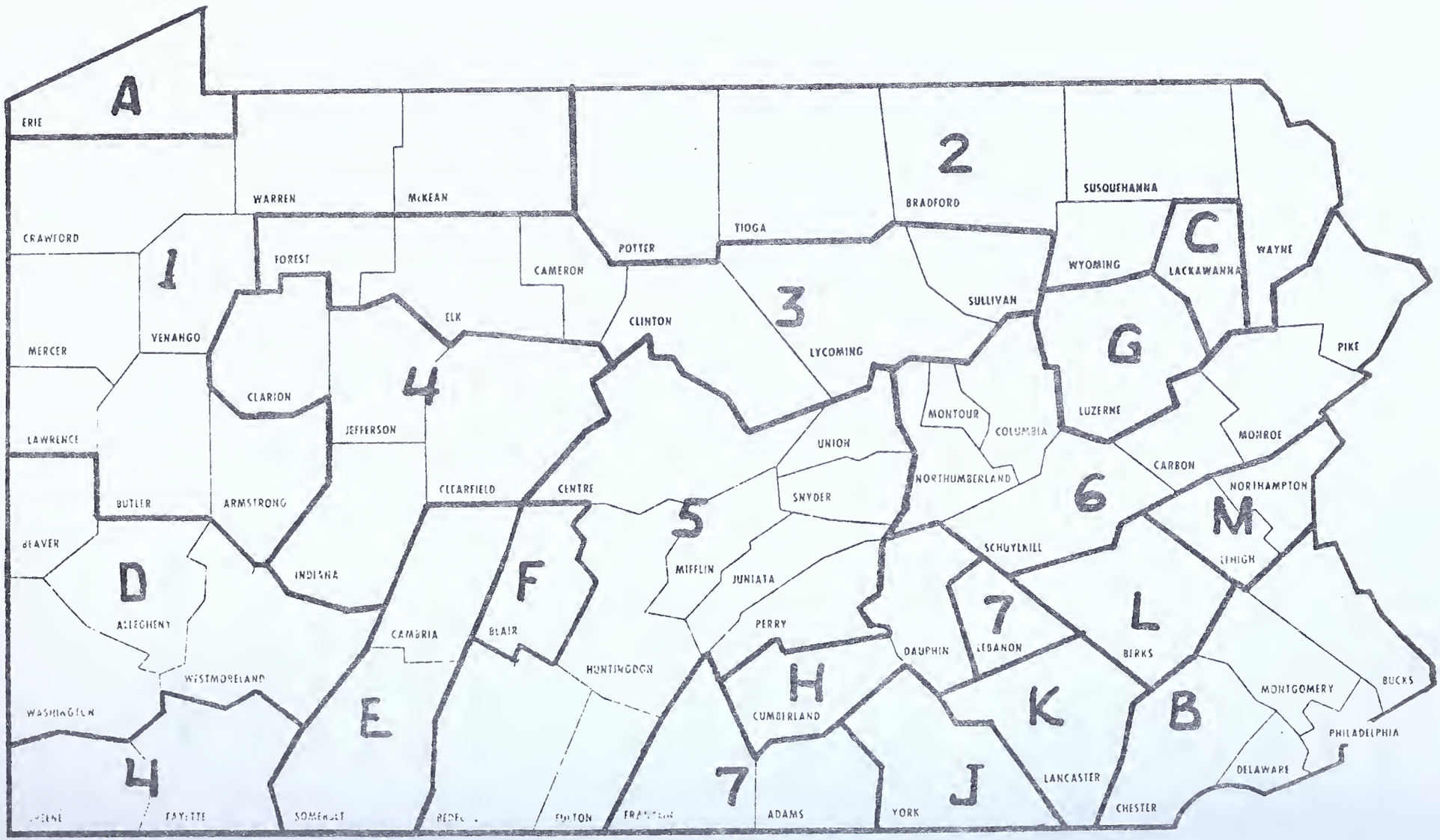

Table 23 - Trend of Net Migration in Pennsylvania, by Labor Market Area, 1960-1970

Labor Market Area	Net Migration 1960-1970	Net Migration Rate 1960-1970
1. Erie*	- 12,920	- 4.7%
2. Meadville	- 1,933	- 2.3
3. Oil City-Franklin	- 5,917	- 8.5
4. Warren	- 1,147	- 2.4
5. Sharon-Farrell	- 9,421	- 6.9
6. New Castle	- 12,042	- 10.1
7. Clarion	- 2,248	- 5.5
8. Butler	1,647	1.3
9. Kittanning-Ford City	- 8,885	- 10.5
10. Indiana	- 1,867	- 2.3
11. Pittsburgh*	-165,047	- 6.9
12. Waynesburg	- 4,300	- 10.7
13. Uniontown-Connellsville	- 22,677	- 12.8
14. Johnstown*	- 33,020	- 11.8
15. Altoona*	- 9,014	- 6.2
16. Bedford	- 4,049	- 8.7
17. Huntingdon	- 3,213	- 7.6
18. Punxsutawney	- 5,210	- 10.7
19. Clearfield-Du Bois	- 12,436	- 14.3
20. St. Marys	- 3,941	- 9.5
21. Emporium	- 1,142	- 13.9
22. Bradford	- 6,337	- 10.9
23. Coudersport	- 1,333	- 7.5
24. Wellsboro	- 505	- 1.3
25. Sayre-Athens-Towanda	- 2,600	- 4.3
26. Dushore-Laporte	- 577	- 8.6
27. Tunkhannock	1,249	7.0
28. Susquehanna*	- 1,368	- 3.8
29. Bellefonte-State College	- 9,394	- 10.5
30. Lock Haven-Renovo	- 2,651	- 6.6
31. Williamsport*	- 5,577	- 4.7
32. Lewistown	- 3,694	- 6.1
33. Sunbury-Shamokin	- 7,281	- 4.2
34. Berwick-Bloomsburg	- 981	- 1.8
35. Pottsville	- 14,241	- 8.2
36. Northeast Pennsylvania*	- 12,618	- 2.0
37. Honesdale-Matamoras	3,106	8.3
38. Chambersburg-Waynesboro	2,334	2.4
39. Harrisburg*	7,854	2.1
40. Lebanon	268	.3
41. York*	9,945	3.4
42. Lancaster*	11,141	3.6
43. Reading*	5,884	2.0
44. Allentown-Bethlehem-Easton	9,498	2.0
45. Philadelphia*	- 58,838	- 1.6
Pennsylvania	-366,710	- 3.0

Source of Basic Data: 1960 and 1970 Population Census.

the Pennsylvania economy.

Myrdal's argument on age-selectivity of migration does not apply to all Pennsylvania sub-regions. From the last two columns of Table 24 we can see that the proportion of inmigrants and out-migrants in age group 20-39 years old varies from area to area. There is a tendency that migration favors the highly developed areas rather than the rapidly growing areas. During the period from 1965 to 1970, Pittsburgh and Philadelphia labor market areas respectively lost 165,047 and 58,838 people, but both areas made gains in the proportion of their population in their labor force, e.g., Pittsburgh has 49.7 percent of inmigrants and 47.5 percent of out-migrants with age 20-39 and Philadelphia's inmigrants and outmigrants accounted for 50.9 percent and 46.6 percent for the same age group. Two other areas with favorable migration are Harrisburg and York. On the other hand, rapidly growing areas such as Lancaster, Reading and Allentown-Bethlehem-Easton and the rest of the lagging areas in the state experienced an unfavorable migration.

It is worthy to notice that the population with age 20-24 years old are the most mobile age group, and that Pennsylvania has had a considerable loss of population in this age group in past decades* During the 1965-1970 period 22.3 percent of people leaving Pennsylvania and 17.6 percent of the new arrivals were in this age group. Except for Philadelphia, Pittsburgh and Bellefonte-State College where the migration in this age group was favorable due to the economic attraction or an impressive number of school enrollment, the rest of the state lost young people in this age group, particularly in far-reaching rural areas and highly stagnant regions.

Remembering that the net migration of the population in labor force is a function of changes in employment in different types of industries, and recalling from Table 21 that the unemployment rate is different in various skill levels

*During the 1965-1970 period the state's departure of population in the 20-24 age group was significantly affected by the draft of young men for service in Vietnam.

Table 24 - The Percentage Distribution of Inmigrants and Outmigrants in Pennsylvania, by Age and by State Economic Area, 1965-1970*

Area \ Age	Total		5 - 9		10 - 14		15 - 19		20 - 24		25 - 29		30 - 34		35 - 39		40 - 44		45 - 54		55 - 64		65+		20 - 35	
	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O
Area 1	100.0	100.0	13.5	9.2	9.2	7.3	13.4	12.7	15.5	26.8	13.6	12.5	7.9	6.7	5.9	4.8	4.6	3.6	6.1	6.7	4.5	4.3	4.7	4.7	42.9	50.8
Area 2	100.0	100.0	13.6	10.7	9.5	8.0	9.7	13.4	13.6	24.9	12.9	11.6	9.3	6.9	6.8	5.0	5.0	3.6	6.8	5.3	5.9	4.0	7.1	6.7	42.6	48.4
Area 3	100.0	100.0	12.4	10.6	9.1	9.0	14.4	11.9	18.7	23.2	12.9	14.4	7.4	5.5	5.9	4.7	4.0	5.1	6.9	6.5	4.0	4.6	4.4	4.6	43.1	47.8
Area 4	100.0	100.0	12.4	9.4	9.5	7.2	16.2	11.9	17.2	27.2	11.8	13.4	7.4	6.3	5.4	4.8	3.8	4.3	6.3	5.9	4.5	4.0	5.5	5.7	43.6	51.7
Area 5	100.0	100.0	9.9	9.0	6.8	6.0	13.5	9.4	29.0	24.7	13.9	23.7	8.0	7.5	4.9	4.6	3.6	3.1	4.5	4.9	2.8	3.4	3.3	3.6	55.8	60.5
Area 6	100.0	100.0	12.7	8.9	9.7	7.5	11.4	11.6	13.3	26.3	12.0	13.2	8.1	6.5	7.2	5.2	4.8	4.4	7.4	6.5	6.5	3.9	7.1	6.0	40.6	51.2
Area 7	100.0	100.0	11.7	10.8	9.2	7.3	11.9	12.5	17.1	24.5	12.2	13.2	6.7	6.7	6.0	5.6	5.1	4.3	7.3	6.9	4.1	3.5	8.8	4.8	42.0	50.0
Area A	100.0	100.0	12.5	10.2	9.8	8.7	14.4	10.9	16.8	23.8	14.0	13.9	8.7	7.1	6.0	4.8	4.7	4.6	5.5	6.1	2.8	4.6	4.9	5.4	45.5	49.6
Area B	100.0	100.0	10.8	10.7	8.8	8.6	9.1	10.4	19.3	17.8	16.9	13.8	8.4	8.6	6.3	6.4	5.4	5.1	7.2	7.2	3.4	5.3	4.5	6.3	50.9	46.6
Area C	100.0	100.0	12.7	9.1	7.7	7.0	10.1	10.9	14.7	25.6	14.7	14.2	9.9	7.3	6.2	4.8	5.7	4.3	5.7	7.1	6.0	3.8	6.6	5.9	45.5	51.9
Area D	100.0	100.0	12.5	9.9	9.3	8.3	9.4	12.4	16.6	22.1	17.6	12.1	8.9	7.3	6.6	6.0	5.4	4.9	6.8	6.3	3.2	4.9	3.7	5.8	49.7	47.5
Area E	100.0	100.0	14.8	9.3	7.9	6.4	11.3	13.5	14.7	29.9	16.1	12.4	9.4	6.5	4.9	3.8	4.4	3.0	6.4	5.5	4.8	4.9	5.3	4.8	45.1	52.6
Area F	100.0	100.0	13.8	9.9	9.8	8.1	10.0	12.7	12.9	24.9	15.6	12.2	9.3	7.5	5.6	5.1	5.0	4.4	8.0	6.1	4.8	3.4	5.2	5.7	43.4	49.7
Area G	100.0	100.0	14.0	8.6	9.3	6.5	9.0	10.2	11.9	25.3	14.9	15.9	10.7	7.4	6.6	4.9	5.1	4.3	7.0	5.9	5.9	4.4	5.6	6.6	44.1	53.5
Area H	100.0	100.0	11.5	11.5	9.9	9.6	11.2	11.9	17.0	19.7	13.4	11.4	8.2	7.4	6.8	5.9	6.3	5.7	8.0	8.7	3.6	3.9	4.0	4.3	45.4	44.4
Area J	100.0	100.0	13.3	11.2	9.0	9.4	7.2	13.4	15.0	21.7	17.1	10.0	9.7	7.6	6.4	6.1	5.1	5.3	8.2	7.2	4.3	3.9	4.7	4.2	48.2	45.4
Area K	100.0	100.0	12.1	9.8	7.9	8.7	12.0	11.9	18.8	24.1	15.8	13.7	8.9	7.6	5.5	5.6	4.3	4.8	5.4	7.0	4.0	3.2	5.3	3.8	49.0	51.0
Area L	100.0	100.0	12.3	9.7	8.5	7.6	13.0	11.2	15.3	24.2	14.0	13.0	8.8	6.5	5.2	5.1	5.4	4.5	7.8	7.5	4.3	4.7	5.4	6.0	43.3	48.8
Area M	100.0	100.0	11.8	8.9	8.4	7.2	10.7	12.8	17.3	23.5	15.4	15.4	9.6	7.4	5.0	5.5	5.3	4.3	7.7	6.4	4.1	3.6	4.7	5.0	47.3	51.8
Penn-sylvania	100.0	100.0	12.0	10.0	8.9	8.1	10.9	11.6	17.6	22.3	15.3	13.5	8.5	7.5	6.1	5.6	5.1	4.6	6.8	6.7	3.9	4.5	4.9	5.6	47.5	48.9

Note: I - inmigration O - outmigration

Source of Basic Data: The U. S. Bureau of the Census, Migration Between State Economic Areas, 1970.

* Refer to Figure 3 for designation of State Economic Areas.

of labor force and in different areas, we may expect that changes in employment in different industries would make different contribution to net migration of the population of labor force age. In a recent study on population change and redistribution in Pennsylvania, Raphael and Gillaspy attempted to make this point clear.* In their investigation they included the level of mechanization in a multiple regression analysis of selected industrial sectors. Employment changes from 1960 to 1970 (for manufacturing industries from 1961 to 1968) for selected sectors for counties were used as independent variables to measure the influences on migration. ** That is:

$$Y_m = 1.012\ X_1 + .976X_2 + 1.013X_3 + .949X_4 + 1.039X_5 + 1.184X_6 + .958X_7 + 1.006X_8 + .475_9X \quad (R^2=.999,\ F=72174.9,\ S_e=113.09,\ Se/\bar{Y}=.0408,\ d.f.=58)$$

and

$$Y_f = 1.129X_1 + .994X_2 + .973X_3 - .047X_4 + 1.098X_5 + .598X_6 + .896X_7 + .993X_8 + .022X_9 \quad (R^2 = .9998,\ F = 39256.6,\ S_e = 130.62,\ S_e/\bar{Y} = .0626,\ d.f. = 58)$$

Wher Y_m - male net migration

Y_f - female net migration

X_1 - change in employment in agricultrual and construction industries

X_2 - change in employment in service industries

X_3 - change in employment of production workers in Type 1 (low levels of mechnization) manufacturing industries

X_4 - change in employment of production workers in Type II-IV(high levels of mechnization) manufacturing industries

X_5 - change in employment of salaried workers in Type I manufacturing industries

X_6 - change in employment of salaried workes in Type II-IV manufacturing industries

X_7 - changes in unemployment

X_8 - change in the non-labor force population

X_9 - the 1960 population (introduced to take account of deaths)

From the above two equations it appears likely that any change of employment in each sector of industries would result in respondent change of net migration i.e., a change

*Zelinsky, W., and associates, Population Change and Redistribution in Nonmetropolitan Pennsylvania, 1950-1970, a report submitted to National Institute of Child Health and Human Development and The U.S. Department of Health, Education and Welfare, Under Contract NIH-NICHD-72-2743, 1974, p.p. 219-269.

** See Ibid. Table D-8.

of one job opportunity could create an additional migrante* The only exemption is that net migration does not significantly respond to the change of female production and salaried workers in advanced manufacturing industries. It seems that female workers in more specialized jobs in manufacturing industries have less mobility, at least at the county level.

It is significant that in one area the people who are out of jobs and remain in that area tend to increase the area's unemployment rate and to detract from the area's per capita personal income. Therefore, from the point of view of personal income the emigration of any age distribution may be helpful in some degree, rather than detrimental to that area. This may be explained by the two following cases. First, with everything else being equal, when one area's marginal productivity of labor is zero or very low, the area's emigrants, even those who are in the labor force age, would not significantly affect the areas aggregate personal income, and might rise per capita personal income. Second, if one area has a certain amount of capital investment and this investment can not provide additional jobs, when emigration occurs the area's capital-labor ratio would rise and this consequence of emigration would tend to increase per capita personal income.**

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* The expected range of multiple regression coefficients in both equations is from zero to 1.0 Coefficiens exceeding 1.0 or less than zero are not statistically different from 1.0 or zero.

** For more discussion refer to Okun, B. and R. W. Richardson, "Regional Income Inequality and Internal Population Migraion", Regional Development and Planning, edited by J. Friedman and W. Alonso, the MIT Press, 1964, p.p. 303-319/

Commutation

The commutation in this study is defined as workers who live in a labor market area and travel to work in other labor market areas. Like migration, commutation tends to narrow the gap of regional income differential. The cause of commutation may be observed from two aspects. With the desirability of living in small cities and countryside many workers move from central cities of one labor market area to the countryside of other labor market areas while keeping their jobs in the central cities.* This type of commutation introduces migration. The second type of commutation occurs due to the shift of jobs. People lose their jobs in the labor market area of residence and got jobs in other labor market areas without changing their residence. This type of commutation can occur due to a local shortage of jobs, or inadequate training of the local labor force, or both.

As shown in Table 25 there is a tendency for an increase in commuting. Except for Bellefonte-State College, Sunbury-Shamokin and Northeast Pennsylvania, all other Pennsylvania labor market areas experienced a sizable increase in commuting workers. In the state average the proportion of all workers who worked outside labor market area of residence has increased from 6.5 percent in 1960 to 9 percent in 1970. In 1970 the percentage of workers crossing the boundary of one labor market area to work in other labor market areas ranged from 2.6 percent in Pittsburgh to 38.4 percent in the Susquehanna labor market area.

* The 1970 population census reveals that in 1970 59.5% of Pennsylvanians lived in cities with population 50,000 and over and in suburbs of central cities with population 500,000 and over, while only 28.8 percent of Pennsylvanians preferred to live in these areas. See Zelinsky, op. cit., p. 278.

Table 25 - Commutation in Pennsylvania, by Labor Market Area, 1970

Labor Market Area	1970 Net Commutation	1970 Net Commutation Rate[1]	Percent Residents Who Work Outside Labor Market Area of Residence 1970	[illegible]
1. Erie*	2,300	2.3%	3.0%	[illegible]
2. Meadville	- 1,095	- 3.6	14.2	11.[illegible]
3. Oil City - Franklin	- 466	- 2.1	13.7	[illegible]
4. Warren	- 1,079	- 6.2	13.6	1[illegible]
5. Sharon-Farrell	1,094	2.4	13.5	[illegible]
6. New Castle	- 2,974	- 7.8	22.1	17.[illegible]
7. Clarion	- 1,050	- 8.3	21.8	[illegible]
8. Butler	- 1,929	- 4.4	20.0	1[illegible].2
9. Kittanning-Ford City	- 4,223	-17.4	35.5	2[illegible]
10. Indiana	- 1,157	- 4.3	20.4	18.6
11. Pittsburgh*	18,147	2.1	2.6	2.2
12. Waynesburg	251	2.4	25.9	16.3
13. Uniontown-Connellsville	-10,233	-22.2	31.3	26.3
14. Johnstown*	- 981	- 1.1	7.7	5.1
15. Altoona*	3,036	6.0	5.5	3.9
16. Bedford	- 2,199	-14.9	24.7	19.7
17. Huntingdon	- 1,462	-11.1	21.7	16.[illegible]
18. Punxsutawney	- 495	- 3.2	20.1	1[illegible].8
19. Clearfield-Du Bois	- 2,058	- 8.1	21.6	14.7
20. St. Marys	38	.3	6.5	6.3
21. Emporium	161	5.4	9.6	5.0
22. Bradford	- 830	- 4.3	14.7	8.1
23. Coudersport	- 931	-16.7	28.8	21.6
24. Wellsboro	- 1,986	-14.8	22.7	18.7
25. Sayre-Athens-Towanda	- 2,063	-10.0	20.9	16.2
26. Dushore-Laporte	- 274	-13.5	29.7	19.4
27. Tunkhannock	76	1.1	30.7	26.0
28. Susquehanna*	- 3,209	-25.4	38.4	26.8
29. Bellefonte-State College	2,580	6.4	7.0	[illegible].1
30. Lock Haven-Renovo	99	.7	14.6	7.1
31. Williamsport*	1,848	4.2	6.1	4.6
32. Lewistown	- 1,517	- 6.5	12.9	10.1
33. Sunbury-Shamokin	- 2,032	- 3.1	9.4	10.3
34. Berwick-Bloomsburg	1,507	6.4	14.1	10.0
35. Pottsville	- 7,801	-12.6	18.9	15.7
36. Northeast Pennsylvania*	- 1,258	- .5	6.8	8.4
37. Honesdale-Matamoras	- 1,935	-13.0	27.0	19.3
38. Chambersburg-Waynesboro	- 794	- 1.8	13.9	11.2
39. Harrisburg*	15,813	8.6	7.7	5.4
40. Lebanon	- 4,506	-10.5	19.0	17.5
41. York*	- 4,461	- 3.2	13.0	9.0
42. Lancaster*	- 4,355	- 3.2	10.2	5.9
43. Reading*	- 3,163	- 2.4	14.8	9.0
44. Allentown-Bethlehem-Easton*	5,622	2.6	10.1	6.1
45. Philadelphia*	20,670	.5	7.7	4.5
Pennsylvania			9.0	6.5

[1] Net commutation expressed as percent of total worker by residence.

Source of Basic Data: The Pennsylvania Governor's Office of State Planning and Development, Population Information, Patterns of Commutation in Pennsylvania by County, June 1974.

Table 25 indicates that urbanized labor market areas have a smaller commuting rate. It is probably due to the consideration of commuting as a variable in defining labor market areas, such as metropolitan labor market areas. The commutation within a labor market area has not been accounted for in this observation. Another reason is possibly that rural market areas have less job opportunities, therefore, commuting workers in some of rural labor market areas account for more than one quarter of their employed labor force, such as Kittanning-Ford City,Oil City-Franklin-Titusville, Waynesburg, Uniontown-Connellsville, Bedford, Coudersport, Dushore-Laporte, Tunkhannock and Susquehanna. As expected those labor market areas with high out-commuting rate are those areas with low per capita personal income and which also have experienced high out-migration rates.

In Pennsylvania we also find that in some areas the skills of the local labor force do not meet the local jobs' requirements. For instance, in 1970 the Waynesburg out-commuting rate was 25.9 percent, but the area had a net in-commutation rate 2.4 percent and in Tunkhannock where job opportunities were one percent more than the area's employed labor force, about one-third of the area's workers were commuting in 1970. From this observation it is most likely that the difference of commuting behavior between rural and urban labor market areas is the result of differentials in accessibility to alternative industrial employment opportunities.

It appears that commutation tends to favor originating labor market areas more and favor destinating areas less. Through commuting the originating area will increase it's aggregate income in wages and salaries and raise personal income while the destinating areas would benefit from its economic expansion and attract net immigration from other areas.

VII. Market Potentials

In this section an attempt is made to observe the effect of accessibility on the regional income inequality. The variable of market potential will be used in this observation. The market potential of any region is closely related to its connections with exogenous regions. An obvious measure of the possibility of interaction occurring in a given region is total population. However, population tends to give more emphasis to biological determinants of population number rather than to economic determinants. Therefore, the aggregate income, weighted population times per capita personal income of each labor market area, was selected for the measurement of interactions. The factor of distance, functions as an impediment in these interactions.

In this study the gravitational potential model was used to compute the "market potential." The market potential produced at a point i by a mass of aggregate income at j, which may be designated $_iv_j$, is defined as a constant, G, times the mass at j, say Y_j, divided by the intervening distance, D_{ij}; that is,

$$_iV_j = \frac{G\,Y_j}{D_{ij}}\ **.$$

Thus, the potential created upon the center of Harrisburg by the Philadelphia mass might be defined as a constant times the aggregate income of Philadelphia divided by 100 miles. When, as in reality, more than one mass exists, the

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*For the introduction of gravitational concepts into the social field refer to Stewart, J. Q., "The Development of Social Physics," American Journal of Physics, Vol. 18 (5/50), pp. 239-253, Zipf, G. K., Human Behavior and the Principle of Least Effort: An Introduction to Human Ecology, New York and London: Hafner Publishing Company Press, 1949. For more discussion, see Carrothers, G. A. P., "An Historical Review of the Gravity and Potential Concepts of Human Interaction," Journal of the Institute of Planners, Vol. 22 (Spring 1956), pp. 94-102, Isard, W. and Associates, Methods of Regional Analysis: An Introduction to Regional Science, Cambridge Massachusetts: The MIT Press, 1960, Chapter 11, and Ou, F.L., Hypotheses, Experiences, and Applications of Demogravitation, Unpublished Thesis of MRP, The Pennsylvania State University, September 1970.

** Unlike gravitational potential, which is a measure of vector, the income potential is a scalor quantity.

total potential at point i, designated $_iV$, is the sum of the separate potentials produced by each mass. Thus, if the masses are numbered from 1 to n,

$$_iV = \frac{G\,Y_1}{D_{i1}} + \frac{G\,Y_2}{D_{i2}} + \ldots + \frac{G\,Y_n}{D_{in}} = G\sum_{j=1}^{n}\frac{Y_j}{D_{ij}}$$

It should be noticed that this formulation is based upon a Newtonian analogy with the assumption that the influence of area i to area j is attenuated by the distance between two areas. In 1970 this model has been modified with the consideration of human behaviors, competition and intervention. The modified gravitational model is called the theory of demogravitation.* Based on the demogravitational theory, the sum of growth potentials produced at point i by n masses should be

$$_iV = \frac{QY_1}{D_{i1}} + \frac{Q(Y1+Y2)}{2(D_{i1}+D_{i2})} + \ldots + \frac{Q\sum_{j=1}^{n}Y_j}{n\sum_{j=1}^{n}D_{ij}} = Q\sum_{j=1}^{n}\frac{\sum_{j=1}^{n}Y_j}{n\sum_{j=1}^{n}D_{ij}}$$

Where Q is a constant.

Since it is possible to compute total growth potential for every point, we may construct a map of market potentials.** Shown in Figure 4 is the market potential map for Pennsylvania in 1970. For the convenience of computation these potentials were computed by using a traditional gravity model, and the map done with the use of equipotential countour lines. In the construction of this map many labor market areas were divided into counties. The aggregate income for each area was assumed to be concentrated at a control point. In this study, a major city of each area was used as that area's control point. Distances

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*For the development of demogravitational theory refer to Ou, op. cit. and the Demogravitational Theory of Market Areas, Northeast Regional Science Review, Vol. 5, 1975 (forthcoming).

**For the construction of potential map refer to Stewart, op. cit., Stewart and W. Warntz, Macrogeography and Social Science, The Geographical Review, Vol. 48, 1958, pp. 167-184, and Warntz, Macrogeography and Income Fronts, Philadelphia: Regional Science Institute, 1965.

were measured as highway mileage from each control point to all others. The distance within the same area was assumed as 1 mile. Contour line pass through these areas and control points having the same market potential (dollars per mile).

Because the market potential map was constructed with an assumption that personal incomes of individuals are identified with total effective demand in society, a market potential map can be looked upon as a map showing the geographical distribution of effective demand. Also because market potential is a measure of the aggregate spatial relationship of a given point to its aggregate market, the numerical values of market potential can serve as measure of market accessibility. Areas with higher market accessibility have greater market potential.

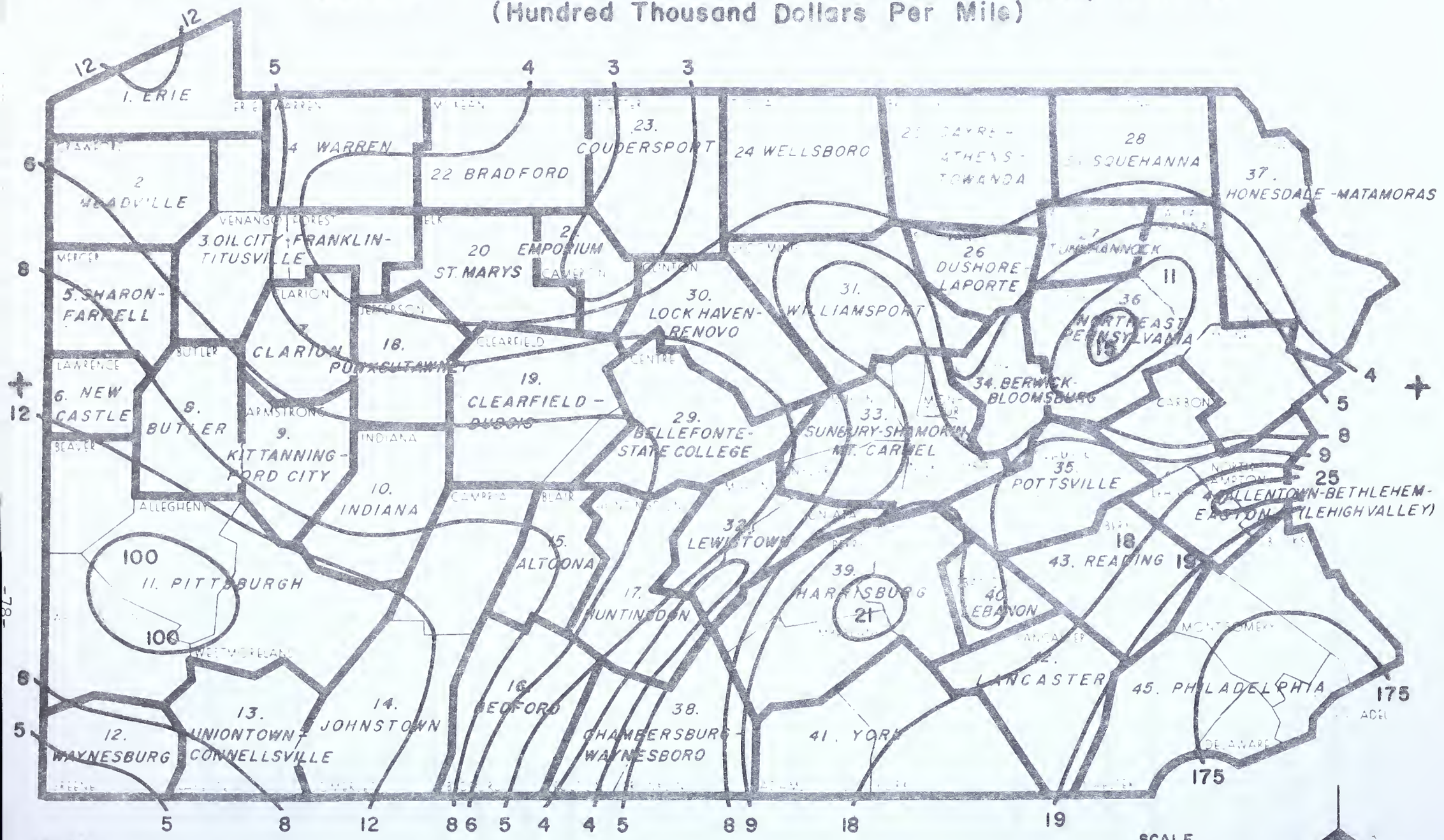
In Pennsylvania, market potential, as illustrated in Figure 5 , is most intense in southeast and southwest Pennsylvania. This level of intensity continues from the southeast toward the northeast, and from the southwest toward the northwest like two plateaus. The intensity of market potential drops off gradually toward the northern part of the state. These two plateaus are separated by a "lowland" of market potential across Lock Haven-Renovo, Sunbury-Shamokin, Lewistown, Huntingdon, Bedford and Chamberland-Waynesboro labor market areas. Because local market demand also was accounted for in the computation of market potentials, each major labor market area produces a "highland" of market potential.

Without accounting for self-potentials or local market demand, Figure 6 portrays a much clear picture for Pennsylvania's market potentials. Both Figures 5 and 6 strongly indicate that there is a high relation between the levels of market potential and personal income, i.e., accessibility plays an important role in affecting regional inequality.

FIGURE 5

MARKET POTENTIALS FOR PENNSYLVANIA, 1970 (I)

(Hundred Thousand Dollars Per Mile)

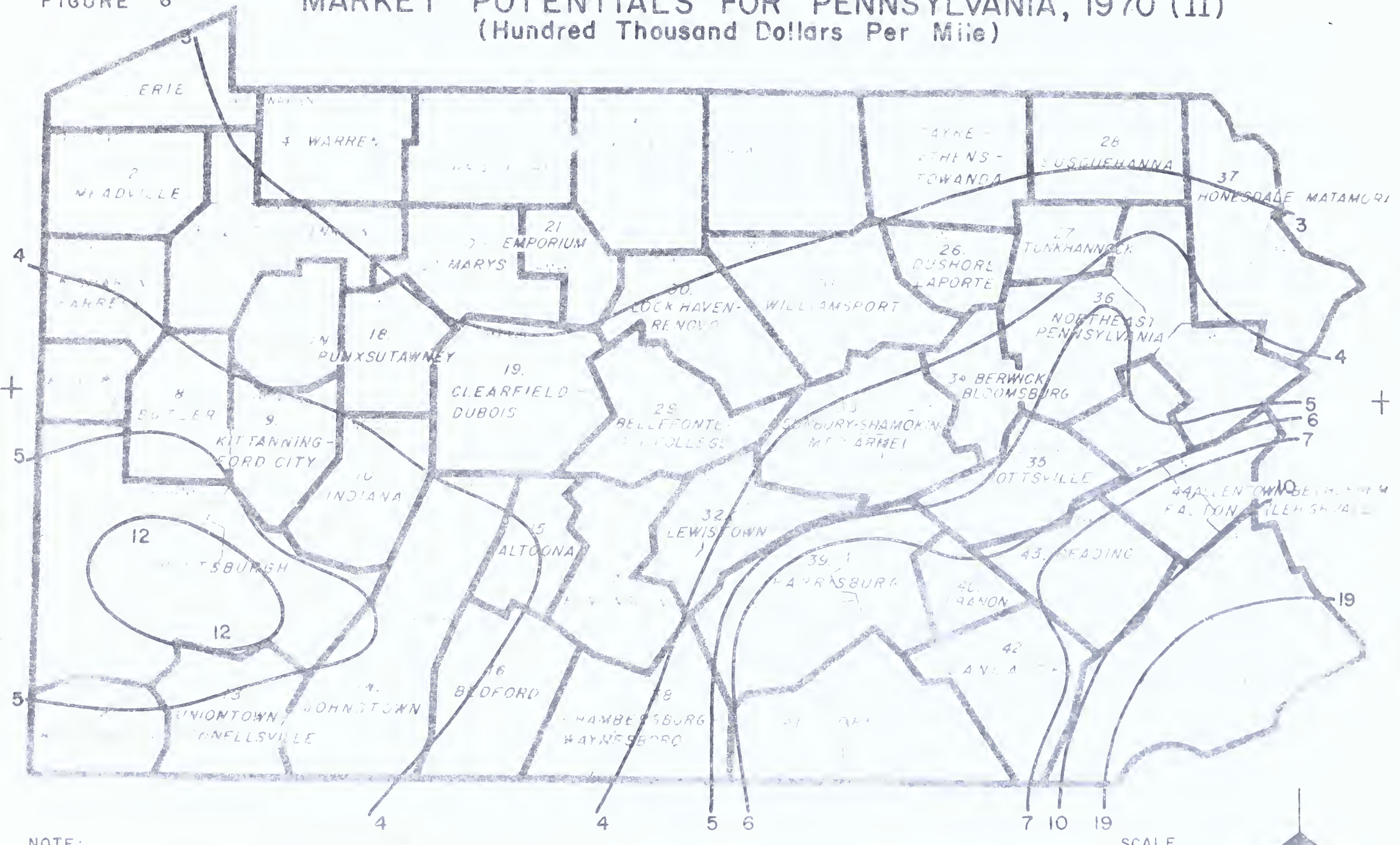


NOTE:
DISTANCE FOR SELF POTENTIAL ASSUMED TO BE 1 MILE

FIGURE 6

MARKET POTENTIALS FOR PENNSYLVANIA, 1970 (II)

(Hundred Thousand Dollars Per Mile)



NOTE:
DISTANCE FOR SELF POTENTIAL ASSUMED TO BE 15 MILES

SCALE
0 15 30 60

VIII. Major Findings

1. Excessive Concentration of Wealth

Pennsylvania's aggregate personal income is excessively concentrated in two major labor market areas, Philadelphia and Pittsburgh. These two areas with less than one-tenth of the state's territory share more than one half of the state's aggregate income. On the other hand, the Appalachia Pennsylvania excluding the Pittsburgh labor market area, with about three quarters of the state territory has only one quarter of the state aggregate income.

2. Trend of Regional Income Inequality

Since, at least as far back as 1929, there has been a tendency for income differentials among labor market areas in Pennsylvania to diminish. From 1929 to 1970, the coefficient of variation in income declined from 24.3 per cent to 12.1 per cent. However, the trend toward interregional income equality in Pennsylvania was lower than the national average in the last two decades.

3. Lagging Zone

Patterns of income distribution show that since, at least as far back as 1929, both the Philadelphia and Pittsburgh labor market areas have acted as two growth urban centers and have spread their effects along diverse channels with varying terminal effects for the whole state economy. However, it seems that Pittsburgh's influence expands toward the northwest, while Philadelphia's influence expands throughout most of eastern Pennsylvania. A zone outside of the influence of these two major growth centers is located in central Pennsylvania running from the southwest, Uniontown-Connellsville, Johnstown and Bedford, to the northeast, Coudersport, Wellsboro and Dushore-Laporte. The per capita personal income of the seventeen labor market areas within this zone is relatively low compared with that of the rest of the state.

4. Intraregional Income Inequality

When intraregional inequality is expressed as income inequality among people within a labor market area, intraregional income inequality has a close relationship with the labor force classified as wage and salary workers. Rural areas with a smaller portion of its employed labor force in the wage and salary category have an intraregional income inequality larger than that of urban areas where the wage and salary workers comprise a greater share of the total employment. More specifically, there tends to be less income inequality among the rural non-farm population, greater among the urban population and much greater among rural farm population.

5. Income Components

Labor income has high relation to the level of development; it tends to be a larger percentage in the higher-income areas. On the other hand, properietors' income has reverse relation with the level of development. The flow of proprietors' income is relatively large in the sparsely populated and farm oriented areas. Both property income and transfer payment have no specific relationship to the level of development.

6. Industrial composition

In Pennsylvania, labor income comprises two-thirds of total personal income. Factors affecting labor income differentials are industrial composition, wage rates and average weekly hours. Assuming that wage rates, average weekly hours and everything else is equal, industrial composition alone could produce per capita labor income differences of more than 30 per cent among labor market areas.

Most of the labor market areas with an industrial composition better than the state average are located in the

western part of the state. Yet, this does not mean that development in the west is ahead of that in the east. Despite the eastern part of the state's less favorable industrial composition, its labor participation rate, particularly female, tends to be high and its unemployment rate low. Both factors, labor participation rate and unemployment rate, narrow the gap of industrial composition between the eastern and the western part of the state and among all the labor market areas within the state. From the distribution patterns of industrial mix, labor pariticipation rate and unemployment rate, it can be seen that industrial development in eastern Pennsylvania, particularly in the southeastern quadrant of the state, has shifted from manufacturing to service industries. Because the wage and salary rates in service industries are relatively low, it could be expected that an area's development of service industries would depress the area's industrial composition; but it could also create more job opportunities which tend to reduce the unemployment rate and increase the labor participation rate and, potentially tend to attract migrants. As a result, southeast Pennsylvania has experienced inmigration in the last few decades.

7. Labor Participation and unemployment rates

The variation in labor participation rates for females is greater than that for males. In Pennsylvania the female labor participation rate reflects the level of development. The higher the female labor participation rate is, the higher the level of that area's development will be. The factor of unemployment also reflects the level of development. However, the unemployment rate has an inverse relationship to the level of development. Areas with higher levels of industrial development tend to have lower unemployment rates. Since the unemployment rate tends to

be low for professional and managerial employment, to be high for clerical and sales employment, and to be higher for skilled manual workers and much higher for unskilled manual employment, rural areas with a greater share of employment in manual workers have a higher unemployment rate, while urbanized areas with a higher percentage of employment in the first two categories tend to have a lower unemployment rate.

8. Public Assistance Income

The percentage of families with incomes less than poverty level obviously reflects an area's economic condition. However, the attitude of families with incomes less than the poverty level applying for public assistance income varies among areas. The 1969 figure shows that families in highly depressed areas and highly urbanized areas have a greater tendency to apply for public assistance income.

9. Migration Flows

In recent decades, Pennsylvania, has experienced net out-migration. However, the 1965-1970 figure indicates that the trend of out-migration in Pennsylvania is declining. Pennsylvania's experience indicates that an area's migration pattern is only an indicator of an area's economic condition and tells little about the per capita personal income. The impact of migration on income has positive and negative effects. In Pennsylvania, inmigrants have a greater dependency ratio, while out-migrants have a greater share of people between the ages 20 to 35 years old who are regarded as the most productive group in the labor force. Generally speaking, migration favors large metropolitan labor market areas, even those areas with out-migration. The impact of migration on

the age structure of large metropolitan areas tends to increase the productivity of the whole population and increase the per capita personal income.

10. Dependency Ratio

The distribution of dependency ratios has geographic concentration; except for Philadelphia and Indiana, most labor market areas in the western part of Pennsylvania have a higher dependency ratio.

11. Commutation

There is a tendency for an increase in commutation in Pennsylvania. From 1960 to 1970 the percentage of all workers who worked outside the labor market area of residence increased from 6.5 percent to 9.0 percent. In some areas more than one quarter of their employed labor force are commuting workers. The 1970 figures show that net out-commuting rate is relatively high in the low-income areas. It seems that commutation tends to favor the origin area of commuting.

12. Market Potentials

Market potential has a high relation to the level of development. In Pennsylvania both Philadelphia and Pittsburgh labor market areas produce high land of market potentials. From each center of these two areas the level of intensity extends with declining rate outward like two plateaus. On the other hand, a lowland of market potentials produced by the economically isolated northern part of the state extends toward the south like a funnel and seperates the two plateaus. Most of the areas covered by the lowland are sparsely populated and economically distressed.

13. Simulation Model of Personal Income

In general terms, per capita personal income is directly affected by industrial composition, wage rates, annual working hours, labor participation

rates, unemployment rates, dependency ratios and public assistance income, and indirectly affected by migration, commutation and market potentials. The relationship between income and related factors can be shown as.

$$Y = f(X_1, X_2, X_3, \ldots, X_n)$$

Where Y is per capita personal income and X's are related factors.

More specifically, the above function can be expressed by a regression equation in a logarithmic form. Because of the limitation of data, only four of these factors can be included in this regression equation.* They are industrial composition index (constant weekly earnings in dollars), X_1, labor participation rate (%), X_2, level of employment(%), X_3, and dependency ratio(%), X_4.

$$\ln Y = -9.39619 + \underset{\substack{(.28039)\\(.29584)}}{.73832 \ln X_1} + \underset{\substack{(.17480)\\(.69314)}}{.97097 \ln X_2} + \underset{\substack{(.96707)\\(.27189)}}{2.22965 \ln X_3} - \underset{\substack{(.12776)\\(-.01658)}}{.02055 \ln X_4}$$

$$(R^2=.60883,\ F=15.56435,\ S_e=.07709,\ d.f.=4.0)$$

This regression equation can be transformed into a nonlinear form.

$$Y = \frac{X_1^{.73832}\ X_2^{.97097}\ X_3^{2.22965}}{2{,}918\ X_4^{.02055}}$$

The figures in parentheses beneath regression coefficients are the standard errors of regression coefficients and the normalized regression coefficients, or β-coefficients respectively. As expected, of the indicators of personal income, all signs for the industrial composition index, labor participation rate and level of employment are positive, and all their standard errors are much less than their coefficients. The sign for the dependency ratio, as expected, is negative, but its standard error is much larger than its coefficient. The result can also be explained by β-coefficients. The β-coefficients show that the labor participation rate is as twice important

* Some variables with negative sign can not be applied to logarithmic equation.

simulant to personal income than the industrial composition index and level of employment, while the importance of dependency ratio simulant to income is not significant. The coefficient of multiple determination, R^2, for the equation is not high, only 60.88 per cent of the variation in personal income is associated with the total variation in industrial composition index, labor participation rate, level of employment and dependency ratio.

When the Bellefonte-State College labor market area, where a large portion of labor force are college students, is excluded from the 45 labor market areas, a regression equation with higher value of R^2 may be obtained, that is:

$$\ln Y = -7.97907 + \underset{\substack{(.25309\\ .36192)}}{.91549}\ \ln X_1 + \underset{(.69430)}{\overset{(.15459}{.96138}}\ \ln X_2 + \underset{(.25446)}{2.06529}\ \ln X_3 - \underset{(-.22185)}{\overset{(.14849}{.35654}}\ \ln X_4$$

(R^2=.69437, F=22.15162, S_e=.06817, d.f.=4.0)

This regression equation can also be transformed into a nonlinear form, such as

$$Y = \frac{X_1^{.91549}\ X_2^{.96138}\ X_3^{2.06529}}{12{,}350\ X_4^{.35654}}$$

The equation shows that without Bellefonte-State College both variables of industrial composition and dependency ratio have increased their importance simulant to income considerably.

IX. Policy Issues

A regional development policy aimed at reducing the imbalance among regions in the distribution of economic activity and in the levels of income, prosperity and welfare should be incorporated in economic and social programs. In the context of state investment planning, the diverse needs and the potentialities of the different regions as well as the geographical distributions of the population, income and labor force should be carefully considered.

The commonwealth is now committed to a statewide comprehensive program for economic planning and development. The primary state planning objective is to turn the tide of the relative economic decline that the state has been experiencing for more than a decade; this is, to assure further growth in employment opportunities and improvements in the economic well-being of all Pennsylvania citizens.

Regional development strategies provide a general framework that could lead to co-ordination between the economic sectors aimed at securing harmonious economic development, and balanced regional growth. What follows is a view of regional planning which represents an attempt to deal with the regional income inequality problems. It is not our purpose to outline a total development program or economic plan here, but rather to suggest certain recommendations for more effective regional planning in terms of balanced growth. These recommendations can be implemental to the state's existing regional development strategies for achieving regional equilibrium.

To provide better balanced growth and to help reduce interregional income inequalities in Pennsylvania, it is proposed that a planning area called the MID-STATE TRIANGLE be established in the economically distressed areas of central Pennsylvania.

The economically distressed areas are defined as the lower-income areas in 1970 and their per capita personal incomes have been persistently behind

the state average for decades. The Mid-State Triangle (Figures 7 & 8) bounded by State Highway 220, linking Williamsport, State College and Altoona, Interstate Route 80, linking Williamsport, Clearfield and Du Bois, and State Highway 219 linking Du Bois, Punxsutawney and Johnstown would be the focal point for direct public investment expenditures and publically induced private investments that would support the development of a major new urban complex and corridor system in Pennsylvania's interior.

The hoped for consequence of this planned development of the Mid-State Triangle would be a revitalization of economically distrssed areas in Pennsylvania through a strengthening of the interdependencies that exist between dominant centers within the Triangle.

The means for developing the Mid-State Triangle are:

a) More Access both to and within the Economically Distressed Area

The most important in the development of the proposed Mid-State Triangle is to improve the transportation network within the area. As shown in Figure 7 (refer to 2000 Intrim Statewide Highway Plan, prepared by Penn DOT) many secondary highways within the economically distrssed area, such as State Highways 220, 219, 322 and 22 are proposed to be reconstructed or widened as major highways. This enunciated highway plan makes the development of Mid-State Triangle more feasible. The proposed highway system will consolidate the economic activities within the economically distressed area and open the Triangle to the rest of the state and the nation, and consequently increase the area's market potentials.

The state should adopt a policy of developing the areas along Interstate 80 in western Pennsylvania. This development policy would result in Interstate 80 producing more of an impact on the local areas, rather than just functioning as an interstate truck line. This development could promote economic development in the central part of the economically distressed area and would complement

FIGURE 7

MAP DELINEATION OF THE PROPOSED MID-STATE TRIANGLE

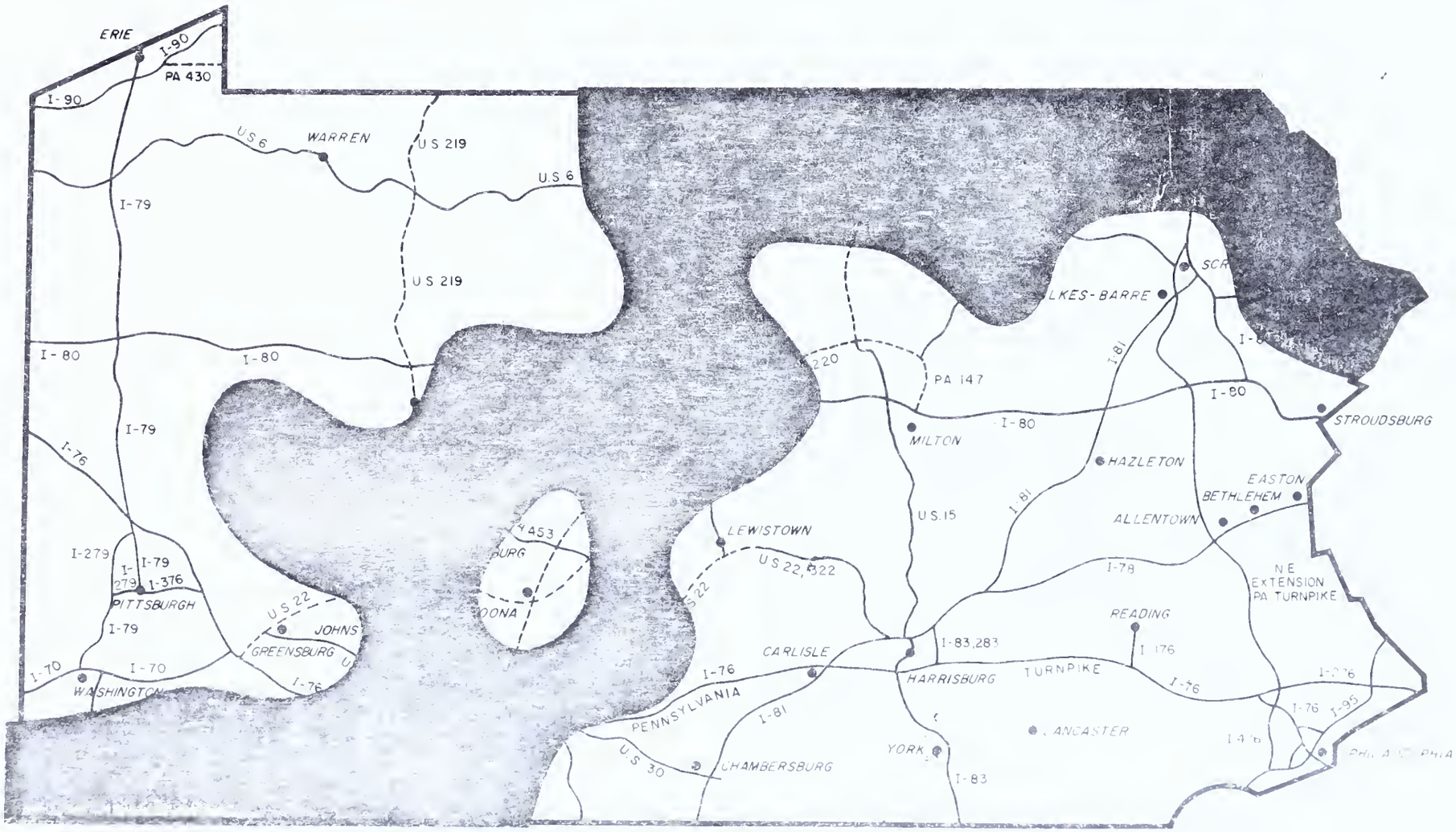
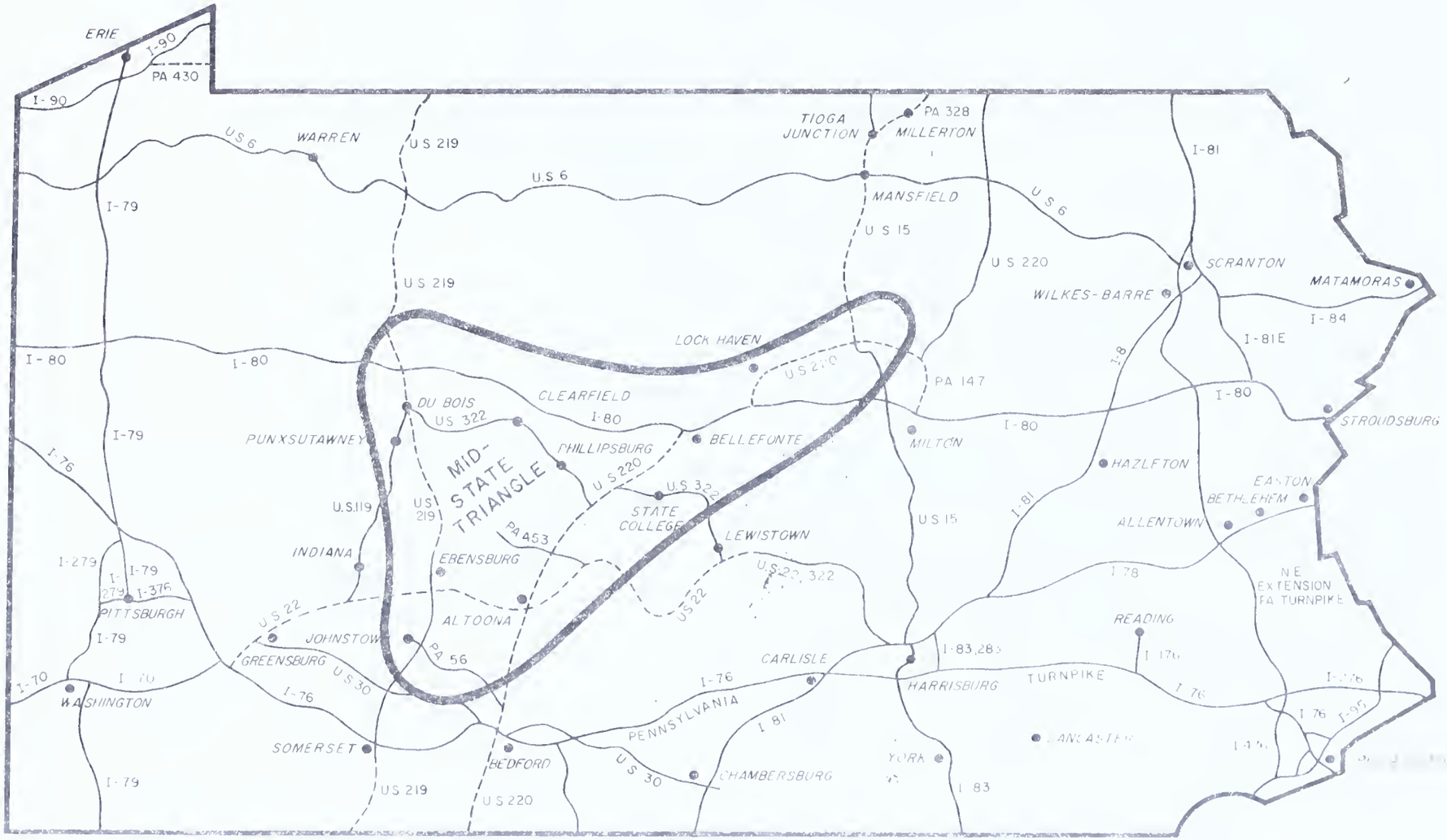


FIGURE 7

MAP DELINEATION OF THE PROPOSED MID-STATE TRIANGLE

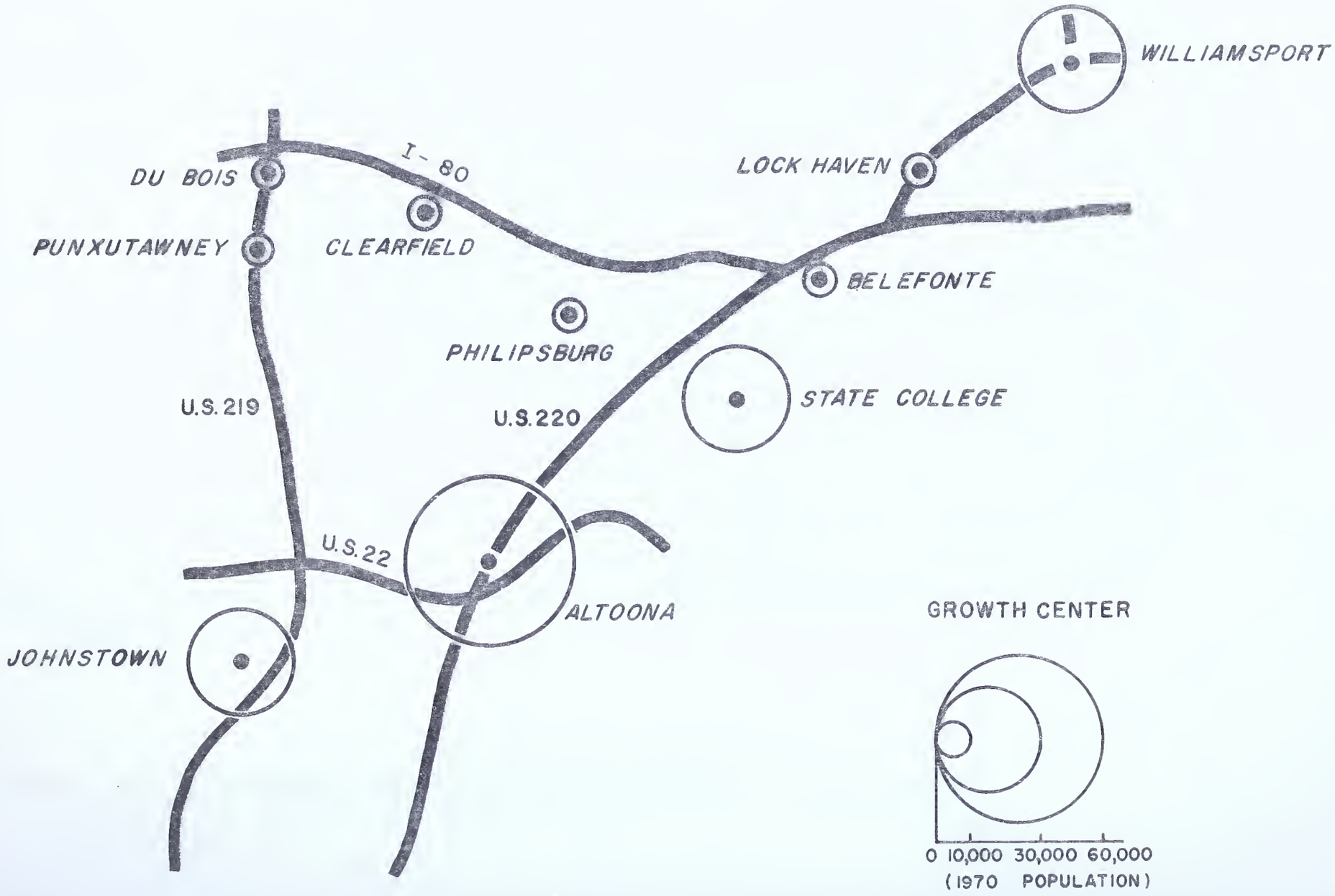


ECONOM[illegible] DISTRESSED ARE[illegible]

PROPOSED UPGRADING [illegible] CONDARY R[illegible] TO MAJOR HIGHWAY

FIGURE 8

URBAN COMPLEX AND CORRIDOR SYSTEM IN MID-STATE TRIANGLE, PENNSYLVANIA



the proposed development of the Mid-State Triangle.

b) Urban Complex and Corridor System

The concept of an urban growth center has long been regarded as an effective tool in dealing with regional inequality problems.* As indicated, central Pennsylvania receives little influence from the two major growth centers, Philadelphia and Pittsburgh. The current development policy of Stimulating the growth of medium sized urban centers in Appalachian Pennsylvania would gradually reduce the interregional income inequality in the long run.** However, to achieve rapid economic growth central Pennsylvania needs large growth centers which can diffuse their spread effects throughout the economically distressed areas.

As have been indicated that the Mid-State Triangle will be more accessible to the rest of the state after the 2000 Interim Statewide Highway Plan is completed. Clearly, the widened State Highway 220 from Williamsport to Altoona will serve as a channel to connect major centers within the Triangle. Williamsport, Lock Haven, Bellefonte, State College, Altoona and Johnstown can be expanded and connected into an economic corridor in the central Pennsylvania. This corridor can also be extended to Pittsburgh. It is close to Northeast Pennsylvania and Harrisburg metropolitan areas and has many channels for reaching southeast Pennsylvania. State College, located at the center of the corridor, should be rapidly expanded; it can provide a well-trained, high skill labor force as well as technical assistance to itself and other centers. Dominant centers from State College to the northwest corner of the Triangle, such as Philipsburg, Clearfield, Du Bois and Punxsutawney, should be further

* Refer to Perroux, F., Note on a Concept of Growth Poles, Regional Economics, edited by D. C. Mckee, New York: Free Press, Publisher, 1970. Hansen, N. M., French Regional Planning, Bloomington, Durham: Duke University Press, 1968. Tolosa, H. and T. A. Reiner, The Economic Programing of a System of Planned Poles, Economic Geography, Vol. 46, No. 3 (7/70), p.p. 449-58. Ou, F. L., Regional Income Inequality and National Development in China, 1974.

** See Ou, F. L., General Trends in Population and Employment, Pennsylvania Appalachia Development Plan, Supplement for 1974, Vol. 1, published by Office of State Planning and Development, July 1973, p. 27.

developed in order to attract present labor force, stablize population and discourage out-migration.* (Figure 8)

In 1970 the Williamsport, Bellefonte-State College and Altoona labor market areas attracted more than seven thousand commuting workers from other labor market areas (Table 25) With the development of Mid-State Triangle the major centers can provide more jobs for the people within and outside the Triangle. It is expected that this development would increase commutation and expand the major centers' hinterlands over the all economically distressed areas.

c) Industrial Development

In formulating an industrial development strategy for the Mid-State Triangle, the emphasis should be on developing those industries within Pennsylvania which have demonstrated rapid growth nationally and are regarded as propulsive sectors in leading a regional industrialization and urbanization.

The national rapid industries can be selected from industrial performance groups one, two and four. The difference of performance among these groups of industries are defined by the Comprehensive Investment Plan for Pennsylvania.** The performance group one industries are national rapid growth industries which have grown more slowly in Pennsylvania than in the Nation, but whose growth still exceeded the all-industry average for U.S. manufacturers. The performance group two industries are national rapid growth industries which have grown more slowly in Pennsylvania than in the Nation and, in fact, they have exhibited slower rates of growth than the all-industry average for U.S. manufacturers. The performance group four industries are national rapid growth which have

* The 1960 and 1970 populations for Philipsburg were 3,872 and 3,700, for Clearfield were 9,293 and 8,176, for Du Bois, 10,667 and 10,112, and for Punxsutawney, 8,805 and 7,792 respectively. All of these municipalities have shared the same experience of losing population during the 1960-1970 period.

** Jurkat, E. H., Manufacturing:Employment, Output and Investment, Interim Report - Technical Working Memorandom No. 2, Comprehensive Investment Plan for Pennsylvania, published by Office of State Planning and Development, April 1974.

grown faster in Pennsylvania than in the Nation.

The selected industries with rapid growth rate should have important interlocking relationships with other sectors of the economy, and can generate sufficient direct and indirect impact on the economy. It is convinced that with a set of expanding industries located in any urban growth center, the center could further expand its economic activity throughout its zone of influence.

d) Incorporate the Factor of Per Capita Income into Investment Policy Formulation

Any program, which is designed to achieve balanced growth, must take into consideration regional variations in the level of per capita personal income. Thereat both public and private investment funds may flow into the economically distressed areas and support the development of Mid-State Triangle.

Many economic development programs in Pennsylvania, such as the Pennsylvania Industrial Development Authority (PIDA), the Commonwealth Urban Development Agency Act (CUDA Act), the Pennsylvania Agricultural Development Authority (PADA), the Urban Economic Development Assistance Act and so on, have used unemployment as a major basis for determining the allocation of public funds to areas. Since unemployment rates alone cannot provide a basis for identifying healthy and sick economic areas and low unemployment rates can, and frequently do, coexist with low levels of per capita personal income, these programs can effectively alleviate only unemployment problems while, in some cases, making a less significant contribution toward balanced growth and reduced interregional income inequalities.

In many cases, low levels of per capita income are the consequence of low labor participation rates and high unemployment rates. Under such circumstances there is greater dependence on public assistance and unemployment compensation. It is recommended that low per capita personal income be a

primary consideration for money allocation. With this consideration, these programs will not only achieve their original goals but also contribute to regional balanced growth.

e) Employment and Manpower Planning

It is important for the State government to assist local government in becoming the nerve center of employment and manpower planning operations for providing adequate information on the job market, adequate facilities for retraining unemployed workers and adequate housing for relocation.

This study strongly indicates that unemployment rates for skilled and unskilled manual workers in Pennsylvania are much higher than that for clerical and sales, as well as for professional and managerial workers. It is also true that the unemployment rate of manual workers in the economically distressed areas is higher than that in the more highly developed areas of the state. Since manual workers in the economically distressed areas (except Bellefonte-State College) comprise a great portion of the total unemployment, it is important to reduce their unemployment rates in order to raise the level of per capita personal income.

It is recognized that simpler production processes are more easily automated, hence lesser skill jobs are subject to a higher rate of displacement. The low-skilled worker who when displaced finds he must return to school and pick more general education before he can ever begin learning a new skill,will find the transition period longer now as he shifts from one occupation to another.

The high unemployment rate for manual workers is caused not only by the higher rate of displacement, but also by the longer transition period. In the economically distressed areas, the circulation of information on job supply and job demand is much less efficient, the training facilities much

less accessible and the housing shortages greater constraints upon relocation. These factors make the transition period even longer in the economically distressed areas than in the urbanized areas.

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